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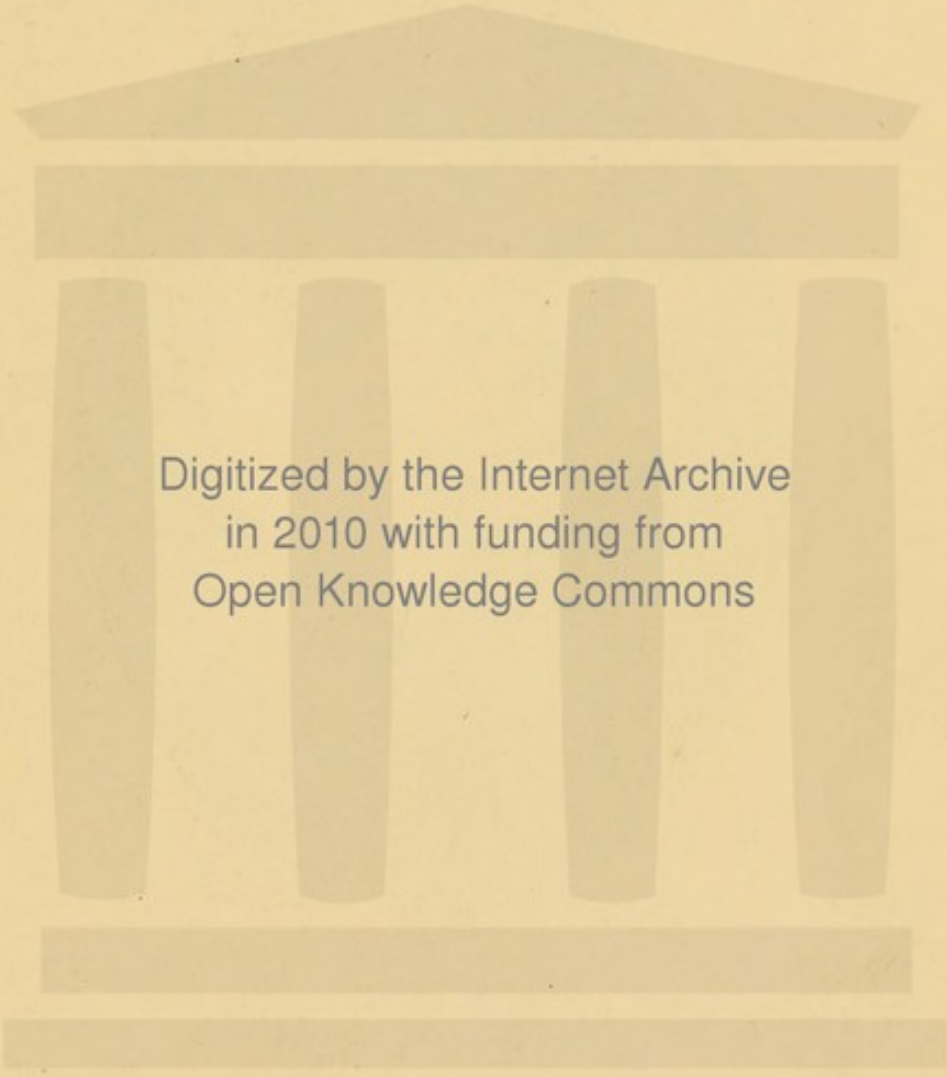


PROGNOSIS

IN

CONSUMPTION.

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HAND OF CHRONIC PHTHISIS. GIRL Æt. 13.

(*Engraved from a Photograph.*)

(See page 231.)

THE

ELEMENTS OF PROGNOSIS

IN

CONSUMPTION.

WITH

INDICATIONS FOR THE PREVENTION AND TREATMENT.

BY

JAMES EDWARD POLLOCK, M.D.

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'Pulmonary consumption is no more than a fragment of a great constitutional malady which it would be vain to think of measuring by the stethoscope, and which it belongs to a higher discipline than any mere skill in auscultation rightly to comprehend.'

LATHAM.

LONDON:

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PREFACE.

I OFFER NO APOLOGY for adding to the already numerous list of works on Consumption. The subject is still incomplete, and must remain so till a higher knowledge than any which we yet possess shall have utilised, and rendered available for practice, the immense collection of facts which the literature of Phthisis now presents to the student.

The observations recorded in the following pages are the result of a minute study of cases at the Hospital for Consumption, extending over ten years. They have been carefully and impartially made, and are, I conceive, due to the Profession. It is hoped that, as simple records of facts, they will be accepted as a contribution to the pathology of the disease.

It will be seen that I have from these facts attempted a classification of Phthisis, and have sought to indicate its varieties and their ultimate progress by such natural characters as shall assist us to their recognition in the daily work of practice.

The illustration of all which tends to induce chronicity in tubercular disease, of the forms in which it becomes most prolonged, and of the influences which assist its arrest or retardation, has received especial attention, and will, it is hoped, prove of interest.

An attempt has been made for the first time to assign a relative duration to the different varieties of Consumption. In the diagrams given, the result of many observations has been represented to the eye; but, although constructed with mathematical accuracy from the materials available, they only express the averages of a few thousand cases, and the deductions will be regarded as merely approximations to truth.

For the considerations on general pathology, and for all purely theoretical statements advanced, I should apologise to the class of readers for whom this work is intended, whose early studies and later experience may lead them to regard these as superfluous.

The tendency of the present day to break up pathology into fragments; the undue importance assigned to auscultation; and the temptation to allow the convenience of a subdivision of practice in large cities into many departments, to represent a similar separation in the great laboratory of nature, must be my excuse.

By repeated reference to the impossibility of considering any morbid phenomenon as single; to the constant unity in all actions of the system; and to the general import of all local disease, I have endeavoured to unite the branch of pathology considered in these pages to the general science from which it has occasionally been sought to sever it.

52 Upper Brook Street, Grosvenor Square:
September 1865.

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THE ELEMENTS

OF

PROGNOSIS IN CONSUMPTION.

CHAPTER I.

PRELIMINARY.

An accurate knowledge of the questions concerned in estimating the prognosis, or probable course and termination, of any given case of phthisis, can only be arrived at by possessing a practical acquaintance with the disease itself; with its origin, history, and most usual course and terminations; with its average duration, its modification by treatment, by inherited or individual tendencies, and by its complication with other diseases; and, finally, with the actual physical condition of the patient on whom we are called to pronounce an opinion.

Without such general knowledge, the most accurate physical examination and the most refined tact in estimating symptoms must fail in establishing more than a diagnosis,—perfect, it may be, as regards the present, but fallacious as representing the future of our case. From a want of perception of this fact arise the mistake so commonly made, of trusting exclusively to auscultation, and the ill repute which the most refined methods of exploration of the chest have occasionally

CHAP. I.

met with from shrewd and sensible observers of symptoms alone, who have often had occasion to conduct through many years of safety individuals who had been stethoscopically condemned to an early death.

There is frequently not only a want of correspondence between symptoms and physical signs, but contradictions between these two kinds of evidence will be found so striking as to weaken the confidence of the unreflecting in either of them. The patient with cavity, who is therefore physically in the last stage of phthisis, may preserve for years a fair degree of health, and in colour, flesh, and appearance forbid even the supposition of disease; while others in the first stage (by auscultation) succumb to the constitutional disorder attending an extensive tubercular deposit, and the blood depravation which has been its cause. Individuals die in all stages of phthisis, and with infinite variety as to the extent of lung disease: they also perish with much variation as to the mode, and therefore as to the existing symptoms, the progress of few of such cases when watched with a discerning eye being exactly alike. The physical signs and the concurrent systemic events often advance *pari passu*, but by no means invariably; the one set of phenomena does not necessarily imply the other; and while neither should be neglected or overlooked, it becomes the highest office of the physician to regard and carefully balance the evidences to be derived from both sources. The one cannot be weighed against the other, but the neglect of either would be unphilosophical. The man who in the present day pretends to despise physical aids, is in darkness while surrounded by light; the auscultator who condemns his patient from certain sounds in his lungs, and neglects to regard the rounded limbs and rosy colour, the tranquil pulse and unimpaired digestion, by which the same individual evidences a healthy sanguification on which the system may draw for its supplies for years to come,

is in the position of one who declares that the building is falling because a wintry storm has displaced some bricks from his roof.

That a disease whose earliest organic manifestations and latest destructive results are most prominently seen in the lung should be capable of detection by that most certain kind of evidence which appeals to our senses, is indeed of great value. To measure the extent and appreciate the stage of mischief in the pulmonary structure was a great achievement of the preceding generation of observers; but in our later refinements and additions to physical knowledge we must beware of attaching to it too high or too exclusive a value. Vital phenomena are of primary importance; systemic disorder, waste of tissue, blood depravation, kill the patient, who in rare cases only can be said to have perished from destruction of pulmonary structure, as an analogous amount of local disease is often tolerated for years in other individuals.

For merely diagnostic purposes we are now possessed of means and knowledge which, applied by competent observers, are sufficient to establish the nature of our case, and the extent of existing local mischief, the negative evidence also derived from physical signs being very satisfactory and valuable.

Diagnosis, however, whose perfection is so desirable to the scientific observer, and which must be established as the basis of his treatment, falls very far short of the requirements of the patient from his medical attendant; and if the individual himself is satisfied that the nature and extent of his disease is known, and its treatment scientifically arranged, his friends have a reserve of questions to be answered, and appeal to the physician for a higher knowledge than even that which he has exhibited in his recognition of the affection. Is it to be fatal? How far can life be prolonged? Are the remedies of removal to foreign

CHAP. I.

climates admissible ?—and an infinite number of social problems connected with the habits, engagements, and relations of the patient arise, which cannot be answered by a statement of stethoscopic information. The whole history of our case and its relative standing in the great history of the disease are here appealed to ; and while mistakes involve, on the one hand, not only the character of the medical adviser, but the far higher consideration of painful anxiety and apprehensions to others, and domestic events of vast importance ; on the other, a correct appreciation of the probable future strengthens the uncertain-minded, saves pain of the deeper kind, and lends a confidence to our treatment which enhances its actual value to the sufferer, and gains merited approbation for his adviser.

The importance of prognosis cannot, therefore, be over-estimated, whilst its very meaning involves an acquaintance with all the knowledge which can be accumulated on the disease and on the individual, from a study both of physical signs and of symptoms.

The experience of a very large number of cases must be brought to bear in elucidating these interesting problems, and the actual as well as the relative value of auscultatory and vital phenomena ascertained, in order to arrive at even an approach to truth in this investigation.

It is not proposed to write a history of Phthisis, nor to weigh the merely diagnostic value of signs and symptoms, but to offer facts derived from the experience of the writer, and in some instances from that of others, which, by illustrating the ordinary history and progress of the disease, its varieties and anomalies, shall furnish us with data for a method of prognosis which shall not be empirical.

CHAPTER II.

GENERAL CONSIDERATIONS ON CHRONIC ORGANIC DISEASE.

CHAP. II.

As we have been led by investigation to recognise that all healthy functions are performed in accordance with a pre-arrangement, and exhibit an invariability in action evidencing the presence of an exciting cause, so it is of disease. Disease is something more than a negative condition, or simple departure from the laws of health. It is true that there is a disturbance of normal actions, but there is no merely chaotic and confused result. The new state of things is not nature let loose, vital condition overturned, and disorganisation resulting from the annihilation of previously existing forces. Properly speaking the word 'disorder' cannot apply to disease. The new condition is simply a substitution of one set of actions for another; and this is not the less true because the transition is productive of mischief to the economy as a whole.

So far as natural laws are concerned, the morbid process is as much under their influence as the healthy. There is never one moment of interregnum; such a cessation of government would be death; that is, the cessation of all vital law. There can be no action without law; in other words, without a defined, limited obedience to governing power. Disease is therefore only another phase of nature's processes—a new form—but equally subservient to rules as health. When a machine is broken, its action as a whole is put an end to till the same train of movements is restored by re-instating its component parts exactly as they were. If it continue to act partially after an injury, its motions are only im-

CHAP. II.

perfect continuations of the original force, not new actions, obeying other laws. It is not so with vital actions. Here, too, there is often imperfect performance of functions; but, when once organic disease is established, new laws come into play and new forces. The difference between the machine and the animal is vitality. The former is made to represent one train of uniform action dependent on a single force; the latter represents many forces capable of conjoint, independent, or successive actions, whose obedience to natural laws never ceases.

We can thus view disease as a defined series of actions in accordance with equally definite causes; and if in morbid conditions we can only recognise disorder, the failure is in our powers of observation or of reasoning.

It is a great help thus to study diseased action as we regard other vital phenomena, and on this foundation alone can our advances be made.

Time and systemic resistance.

The characteristic features of all chronic organic affections as contrasted with acute diseases, are derived from the length of time through which they may be prolonged, and from the resistance of the system to their progress. The nature of the structural changes undergone may not be widely different from those in more rapid affections, but the systemic disorder assumes a different attitude.

System recovers,

tolerates,

or yields.

The system may resist and throw off the structural disease and recover its own balance; or, after a period of violent reaction, it may tolerate and sustain the local disorder as an irremediable injury, continuing the functions of the body with diminished power, but without much manifestation of disturbance to the general health; or the vital powers may gradually yield, and so exhibit the phenomena which constitute the final stage of all organic changes.

The individual organ primarily affected will, of neces-

sity, modify the nature of this resistance, toleration, or yielding of the general system, according to its own standing and relations in the animal economy. Any interference with its structure will alter the train of phenomena, which are necessarily dependent on its integrity. Modifications in the respiratory, circulating, and hepatic functions will naturally follow lesions of the central organs of these systems ; and, while the effect on the whole economy cannot be measured by the extent or degree of local mischief, the morbid symptoms, which are referable to systemic disturbance, will take their tone from the organ which is the seat of disease.

Organ primarily attacked modifies.

Impairment of its appropriate functions will be felt by the system at large in a manner peculiar to the physiological import of the healthy organ. Thus pulmonary inflammation will produce, not only the constitutional disturbance consequent on the lesion of a vital organ, but respiratory effects implying an interference with the appropriate functions of the lungs, the decarbonization of the blood, pulmonary exhalation, etc., and so of cardiac and renal inflammation.

Physiological function of organ modifies.

Another class of phenomena results from the disturbance of organs dependent on that first affected ; as engorgement of the lungs consequent on obstruction in the right side of the heart.

Organs dependent on that first attacked.

In like manner organs allied in function become secondarily affected, and the gravity and import of this reflected disorder must enter into our calculations in estimating the real amount of systemic suffering.

Organs allied in function.

Mere contiguity, or continuity, of structure often gives rise to new constitutional disorder by extension of the original affection, as pleural inflammation in tubercle.

Contiguity.

Secondary attacks on distant organs are of great importance in estimating the gravity of chronic affections, as they indicate, not merely an extension of disease to a new and hitherto unaffected structure, but

Secondary attacks on distant organs.

CHAP. II.

a persistence, and perhaps an increase, in the blood crasis and vital causes which have originated the disorder. Such are deposits in the glands of the ileum, or tuberculous ulceration of the larynx in phthisis.

The systemic disturbance may thus be modified by the influence of secondary organic alterations, as well as by those of a primary order, and each of these having a separate relation to the whole economy in proportion to their peculiar functions, a summary of all must be made in estimating these vital effects.

In considering the gravity of the chronic disease of an organ, we have therefore to examine the nature of its own lesion, and the results to its functions with relation to the system; the amount of injury to the parts allied to it, and likely to become engaged in the morbid changes; the influence of continuity of structure, of mere neighbourhood of position; and secondary attacks on distant parts due to an extended constitutional disorder.

All organic disease systemic.

All organic disease is absolutely systemic disease; as, from the impossibility of any function being singly impaired, no organ can stand alone in the economy.

Products of disease become added to the blood.

Not only does the system at large sympathise with the local injury (as in the fever attending a suppuration), but the products of diseased alterations become added to the blood. That the fever which we call sympathetic in acute inflammations has its origin from these two sources, reacting on each other, seems little doubtful. The resolution of the local disease and the cessation of the blood disorder terminate the attack, if the result is to be favourable; but the frequent supervention of chronic organic alterations in the convalescence from acute illness, argues a continuance of the blood dyscrasis, probably of the same nature which caused the primary attack. The identity of successive lesions of the same or of remote organs powerfully strengthens this view.

The organ which is apparently earliest affected, and whose influence is most observable throughout the series of morbid actions which ensue, generally gives the name to the disease; but the mechanical extent to which its structure is altered or destroyed is not *per se* the measure of the injury inflicted on the system, nor of the gravity of the case. This is exemplified in slow enlargements of the liver, cystic disease, or cirrhosis, with but slight impairment of health; or in the chest by the obliteration of the respiratory space of one lung by fluid in the pleura, which often occurs unsuspected by the patient; or in the toleration by the system of a single large tubercular cavity.

The extent of structural disease not the measure of systemic disorder.

It is probable that there is no such thing as purely functional disorder of organs. The latest researches have proved an intimate connection to exist between the ultimate cells of a secreting organ and the secretion itself, which, in certain instances at least, is accompanied by a cell-exudation. The whole epithelial tract is frequently undergoing this process. The constant waste and renewal of tissues, on which the integrity of all structure depends, if interfered with by what we are accustomed to call functional disorder, is imperfectly performed, and an alteration in the vitality, if not in the form, of the cell results.

No purely functional disorder.

It is only when an accumulation of disorder has altered the essential nutritive action of an organ, and caused its increase or diminution in size, or a new product to be mixed with its own structure,—in other words, when the error in its nutrition, and therefore in its functions, has reached a certain height, and has made considerable progress, that we call the disease 'organic.' But the difference is in degree, and not in character; the process is the same in both cases.

Let us now examine whether we can observe any uniformity in the disturbance of system which invariably takes place in chronic organic affections. First,

Origin of organic affections from acute attacks.

CHAP. II.

as regards the commencement of any organic affection, it very frequently seems to arise from an acute inflammatory attack. The urgency of the local symptoms, the suddenness of the seizure, the greater violence of pain, and the accompanying state of system called fever, characterise and stamp it as acute. An organ so attacked very commonly remains in some form of altered structure, which obtains in time the name of chronic disease; but it is very questionable whether this acute attack was not the result of preceding, slow, and hitherto unheeded changes in its nutrition and its function.

From fevers and after pregnancy.

Again, organic disease has frequently its apparent origin in peculiar states of health, or in fevers of an acute character. The pneumonia after rubeola, which, when unresolved, often runs into tubercles after the lapse of months—the enlargement of liver or spleen after ague, and softening of the brain after fever, are instances of the latter; while the invasion of tubercle after pregnancy illustrates the former.

When such changes in organs as are recognisable by our various methods of diagnosis do not 'resolve', or disappear, after the acute attack which has appeared to originate them, a new condition takes place, very interesting, if not very hopeful. The system has accommodated itself to the altered structure and to the impaired function; the fever subsides, the pain becomes trifling, secretion from the injured organ returns, but in a lessened degree, or with manifest differences in its composition, and a condition which is called 'delicate health' renders the patient an invalid, perhaps, for life. This state deserves study, and has an undoubted use in the economy which has not been sufficiently dwelt on. Its leading features are, emaciation and resulting muscular weakness, impairment of all the processes of assimilation, and a marked tendency to a renewal of irritation in the already enfeebled organ by causes of whatever kind, which in a state of perfect health would

Commencement of organic disease.

System stands at a lower average state.

lead but to slight disorders, such are cold catching and errors in diet. To this we might perhaps add, a singular immunity from epidemic and other acute affections which do not directly and ordinarily fall on the organ diseased.

The system is, in fact, in a lowered state in all its powers. It has adapted itself to an inferior par of health, for the condition described can scarcely be called disease; and, like a machine which has been damaged in one part, the remainder of its complex mechanism must be worked at less pressure, if it is to work at all. With one lung obliterated by pneumonia, it is plain that the respiratory requirements of the system can only be half satisfied, and that to restore the balance we must either reinstate the breathing organ in its integrity, or reduce the volume of blood to be aerated, the amount of carbon to be exhaled; and hence, secondarily, the various tissues of the body requiring to be oxygenated and supplied with caloric. Till this balance is struck in acute disease, the suffering of the patient is often very great; but when antiphlogistic measures, low diet, blood-letting, sudorifics, purgatives, and free secretion from various organs, have lowered the system to a par with the powers of the weakened organ, a great relief is obtained. Very frequently these measures are resorted to without any view to such a result, but nature will (herself) by a hæmorrhage, violent sweating, or profuse secretions, right the machine, and restore the balance between the weak organ and the requirements of the system.

Prognosis as to time less favourable when first attack invades a healthy system.

In cases of chronic disease when the emaciation takes place early, before much organic mischief has occurred, and the system has been, in a manner, prepared for the invasion, there is often a tendency to chronicity established from the outset, which enables us to form a prognosis as *to time*, more favourable than if the structural alteration had suddenly invaded a

CHAP. II.

system working at full power. The latter condition is rapid and often uncontrollable; the former is gradual, accompanied by less disturbance, and is more tolerated by the vital powers. We shall have occasion to point out how this consideration is of valuable importance in our prognosis of phthisis.

Recurrence of acute attacks.

We have next to remark that all chronic organic affections exhibit a liability to a recurrence, more or less frequent, of acute attacks. Their downward progress is, in fact, accomplished rather by a succession of attacks, than by a continuous but slow disintegration of the impaired structure. The mischief thus inflicted on the organ is seldom wholly repaired, and the succeeding embarrassments are generally successively more and more grave in their nature. Those latest in the history of the disease are never limited to the organ which has given its name to the affection, but the secondary disturbance of other parts assumes a prominence whose urgency and danger might well entitle it to be called the leading disease, and which demands in treatment a primary consideration. So far have we been deceived by medical nomenclature, that while it is generally the secondary complications which prove fatal, we accord to the primary the importance of the name, and often a monopoly of the treatment directed to subdue the disease.

Secondary complications generally prove fatal.

Systemic reaction in organic disease of an insidious character appears to follow the rule that all violent commotions are of short duration, and this may be one of the reasons why a succession of attacks is observable, rather than a continued and sustained disturbance. The hectic of phthisis almost always occurs thus, and the longer the interval the more chronic is to be the duration of the case. A long sustained febrile access without intermission is only seen in the more rapid invasions of tubercle, in which indeed the affection, even when

prolonged for months, ceases to deserve the name of chronic disease.

Remissions cease towards the close.

When the disorder of system has reached a certain height and much exhaustion of vital force has occurred, as well as extensive structural disease, these remissions cease, and a febrile condition, in its own tendency continuous and scarcely under control of remedies, prevails, which constitutes the last stage of organic affections. The termination of even such cases is generally precipitated by some secondary disease; and it is to be remarked that in chronic affections of organs, life rarely dies out gradually as the powers decay in old age, but a superadded local disorder, as diarrhœa in phthisis, extinguishes the last remains of vital power, and ends the case.

Life rarely dies out gradually.

Chronic disease with true intermissions lasts longer.

We have to remark, therefore, that chronic affections, with true intermissions between the acute attacks on primary or secondary organs, are likely to last longer than those in which the systemic irritation is continuous, or exhibits little tendency to intermit. The daily remittent character of true hectic is not here spoken of; but successive attacks of febrile irritation and local disorder, with appreciable intervals of time between them, during which the constitutional symptoms considerably or wholly abate.

One acute attack not necessarily fatal.

It is obvious from the preceding observations, that if the ordinary course of chronic disease be to proceed by a succession of attacks, each of which in a degree subsides for a time, we may, in practice, be frequently led into error by mistaking one such access for an urgent and irremediable disorder. The degree of its danger is to be estimated by the order in which it stands to others of a like kind which have gone before it; and it is to be remembered that the natural tendency of all chronic disease is to proceed by steps, alternated with remissions. The extent of local structural mischief is also a corrective, and should always be weighed against the con-

CHAP. II.

stitutional symptoms. A circumscribed, limited deposit of tubercle in one lung will remain dormant for years, and suddenly break up, soften, and leave an excavation, the systemic disorder being seen in an attack of hectic, sweating, and emaciation, which almost threatens the life of the patient. Yet, if the deposit be limited to one part, and if (as pathologically proved) the diseased product be walled in by plastic matter thrown up as a preservative barrier between the healthy and diseased portion of the lung, such attack will subside, the softening and excavation being a truly remedial, natural effort, and the system may and frequently does recover itself, the fever subsides, and every trace of the disease, excepting the physical signs of a cavity, and the symptoms of slight expectoration and dyspnœa on exertion, disappears. The patient in this case is in the lowered condition already described, and lives, in fact, at a standard of respiration, in the largest sense, beneath that at which he stood when in health. Were we to measure the danger of such an attack by the intensity of the constitutional disturbance alone, we should err; the elements of prognosis consisting in the order in which this invasion has occurred, in the localisation of the deposit of tubercle, and in our careful estimate of the inherited or other constitutional tendencies of our patient. It is notorious that few patients die with only one excavation in the lung, and that the most rapid 'consumption' consists in an extensive deposit throughout both lungs.

The extent of local mischief a corrective.

Few die of one cavity in the lung.

Systemic disorder composed of two sets of reactions.

Systemic disorder is to be regarded as composed of two sets of reactions—those resulting from the individual organ first in the chain of disease, and those from the secondary affections. With a single organ, as liver or lung engorged, the constitutional symptoms are grave, and more merit the title of acute than those occurring in a later period, when many secondary derangements have arisen.

Primary fever more acute than secondary.

The fever is more active and its character more sthenic than when many organic functions are disturbed and linked together in their aberrations, yet the latter is the more serious condition.

The hectic fever from an empyema rapidly produced is illustrative of the former state; the secondary systemic irritation from a dropsy depending on congested liver or kidneys, whose disorder is itself a result of mitral obstruction, may afford an instance of the latter. In this case the number of functions conjointly and simultaneously impaired give its peculiar character to the systemic disturbance, and their sum producing a general exhaustion of vital force is the measure of danger.

Each organ has probably its own reaction on the system.

Each individual organ has probably its own mode of reacting, gastric inflammation quickly depressing the nervous and circulating systems, while uncomplicated pulmonic inflammation is much more tolerated by them; and if this difference be observable in acute affections of organs, it is very probably reflected and continued in their chronic disturbances. It is therefore manifest, that the danger is infinitely increased when various organic affections simultaneously react on the system.

CHAPTER III.

RESISTANCE OF THE SYSTEM.

CHAP. III.

We must now examine the resistance of the system to diseased action in its three attitudes of

1. Resistance terminating in recovery;
2. Resistance just sufficient to tolerate the mischief and preserve the organism at par;
3. Resistance which is overpowered and succumbs, the organic affection proving fatal.

In one or other of these conditions all our cases will be found, and on our due estimate of the forces employed will depend our ability to calculate the result.

Resistance terminating in recovery.

Nature competent to the cure.

That Nature is competent to the cure of many disorders of the system, is a proposition which may be regarded as accepted by practical physicians of the modern school. The cessation of fevers within a certain period more or less prolonged; the spontaneous resolution of acute organic inflammations, as pneumonia; of membranous inflammations, as pleuritis and peritonitis; and of acute rheumatism, within calculable terms of time, may be accepted in proof. It is undeniable that under any treatment, or no treatment, such recoveries take place sufficiently often to establish, not only their possibility but their frequency. The influence of various methods of treatment (or interference with the natural processes) is not here under discussion. The fact can be doubted by no one who has devoted himself to the study of disease, and remains as patent and susceptible

of proof as any other physiological event. That nature unassisted by art can therefore resist internal disturbances of the system, and repair even structural alterations of vital organs, is undeniable. The earliest attitude of the system when injury has been inflicted from without is resistance; and all phenomena exhibited, all departures from a state of health have inseparably stamped upon them this feature. It may be difficult to discriminate the disorder existing from the remedial effort at repair, but the tendency to shake off and expel the offending agent is traceable in every symptom. This is very capable of demonstration in acute disorders where the course is rapid and the termination susceptible of proof; but it has not been recognised as the rule in chronic affections, and in the latter is less evident than in the former, owing, no doubt, to the long periods throughout which their progress is continued, and to the variety of pathological phenomena from time to time developed in their course. Above all, secondary lesions mask the original attack, and divert attention from the condition of the organs primarily affected. Yet it cannot be doubted that the rule which prevails in the one is equally powerful in the other. Although the intensity of the symptoms may vary, the difference between acute and chronic diseases is rather in time than in mode, and there are a large number of features common to both. In the more detailed portions of this work, the processes of resistance and repair will be more minutely dwelt on; but it is now sought rather to examine the broad characters of all chronic affections, and to establish the resistance of the system as a fact common to both acute and prolonged diseases of organs.

The mode of resistance may be thus viewed:—

First. There is a preparation to reduce the volume of the circulating fluid, and to waste the tissues, in order that the systemic requirements may not be beyond the

The volume of the blood and the tissues reduced.

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powers of the injured organ to supply. This is accomplished by increased secretion and by muscular waste, by absorption of fat from the tissues, and, to some extent, by deposit of morbid material. The secretions so increased may contain both their natural constituents and additions, which are commonly derived from the detritus of the system.

Local disorder isolated.

Secondly. The local disorder becomes circumscribed, and, in a certain sense, isolated by plastic exudations, which prevent its extension to neighbouring parts, and oppose obstacles to its increase in the organ attacked.

Morbid deposits absorbed, or altered.

Thirdly. Morbid deposits so isolated are in many cases absorbed; in others altered in chemical character and removed from the system.

Remissions.

Fourthly. In whatever constitutes the blood disorder or the local affection, there are distinct remissions to allow of improvement in blood components and in the nutrition of the tissues, the local disorder at such periods remaining in a quiescent state.

Resistance evident in acute diseases.

We are familiar with the phenomena of systemic disturbance which follow any severe local disorder of organs, and have called this group of symptoms by the name of fever. Shivering, increased temperature of the body, rapid hard pulse, thirst, anorexia, and lessened secretions indicate successive shocks to the nervous, circulating, and assimilating systems. The abruptness of the transition from perfect health, and the comparative shortness of the duration of the attack as a whole, are well-described by the term 'acute.' And when such a train of phenomena is set in motion by a cause outside the system, it is no doubt typical of the slower changes which occur in chronic affections. A pneumonia caused by the direct application of cold to the surface in a healthy subject, with its concomitant fever, presents many analogies with a deposit of tubercle in the lung, and its accompanying systemic disorder. There is this difference, that the tubercle is probably

Pneumonia.

due to a preceding depravation of the blood, and certainly to intrinsic causes; but the pneumonia may occur from agencies entirely extrinsic, and the individual attacked may be healthy. As regards the resistance by the system resulting in a favourable termination and resolution, the pneumonia may be examined with advantage, and will elucidate the present views. The object of all reaction of the organism as a whole, when a local injury has been sustained, is directed to counteract existing mischief; to isolate the diseased part, and thus prevent the extension of the morbid action; and, finally, to repair any disorder of structure. In the series of actions which we have called 'morbid,' we can find thus a definite meaning. The conservative and reparative functions of the system are as essential to its existence as are its powers of assimilating nutritious material. They are, it is true, only occasionally exercised, but they are always present, and are like the fire-engine which is kept at hand, yet may rarely be required.

In a pneumonia we find the respiratory function interfered with by a sudden chill. The nervous shock is great and indicated by the rigor; the heart, driven to violent contractions, sends a larger supply of blood more forcibly driven. The local result is exudation of a plastic material into the lung tissue, which annihilates for the time its respiratory function, and insures complete rest for the organ. Aerification of the blood is performed at double power in the opposite lung, as indicated by the compensatory puerile respiration. In the bloody sputa we have only an evidence of much congestion, and the exudation has relieved the extreme vessels, as no doubt a hæmoptysis does in tubercle. In many cases we have a walling off of the affected portion of the lung, as in lobular pneumonia; and, in most cases, we perceive a tendency to limit the mischief. Secretion supervenes and is a relief. The

Effusion of blood a relief.

Secretion a relief.

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system, meanwhile, so long as exudation goes on, retains the pulse at a high pressure. It falls when secretion takes place, and it would have fallen more rapidly if a pulmonary apoplexy had occurred instead of a pneumonia. In the anorexia we can read a plain indication to stop the supplies of respiratory food, and to lower the requirements of the blood for air, and of the tissues for nutritive support. If, as before pointed out, the organism were to remain at full working power, with only half the respiratory space necessary to its normal action, the embarrassment would be proportionably greater. The blood is therefore reduced in volume, the tissues are wasted, and thus relief is obtained. When the period for absorption has arrived, the local structural alterations and the systemic action will together subside, and even where no treatment of an active kind has been resorted to, the case will terminate spontaneously in from 18 to 30 days, the lung being pervious and the patient convalescent, though below his usual average of flesh and strength.*

Spontaneous cures of acute pneumonia.

By contrasting an acute with a chronic affection of the same organ, we have an opportunity of seeing the same laws at work in both.

Analogy between pneumonia and a deposit of tubercle in the lung.

In tracing the analogy between the natural processes in a pneumonia and in a deposit of tubercle as indicative in both of a conservative energy on the part of the system, it must be remarked that in both the febrile disturbance seems to have a common object, viz. an abatement of the requirements of the blood for air, and the necessary reduction of the tissues. In the local

* Through the kindness of the late Dr. Todd, I have witnessed many of these spontaneous cures of pneumonia, the treatment consisting of the external application of turpentine fomentations, and the only medicines used being the acetates of potash and of ammonia. Nor were such cases always ministered to by stimulants, as is erroneously stated by some. No doubt the homœopathic reports of the Vienna hospitals were obtained from cases identical with these; but the fact to be deduced from both series of observations is, that Nature is sufficient for the cure of a single acute pneumonia in a previously healthy subject.

action there is a tendency in both cases to circumscribe the deposit in the lung; and in the ultimate changes in the tuberculous mass we may observe a throwing off of the morbid exudation when it cannot be tolerated, nor raised to a higher organisation. The hæmoptysis has its analogue in the bloody sputa of pneumonia, and a more careful consideration of its meaning would often lead us to regard it as a salutary relief to the local congestion of the lung. The hæmorrhage in the early stages of tubercle is rarely dangerous, and never fatal; and the symptoms denoting irritation of the lung are generally lessened by its occurrence. As importing a severe lesion of the lung it is a grave symptom, but considered only as a hæmorrhage it is trivial.

The tendency in all diseased action may be assumed to be towards cure; and this is seen in the resistance opposed by the system to the progress of all lowering structural changes. Malignant growths would seem to be exceptions. We cannot, it is true, detect in the morbid product itself any tendency towards structural improvement, but its progress is opposed by the vital powers. In rare cases, even cancer is circumscribed by plastic firm exudations, which insulate and compress it so that the indurated mass withers and disappears.*

Even cancerous growths have withered.

The localised tubercular deposit, whether consisting of grey, single, miliary masses, or of a softer and more diffused exudation, has no doubt, in many instances, been absorbed or thrown off. The frequent occurrence of small cicatrices in the lung attest this; and there is now no doubt that many individuals undergo slight attacks of tubercle which they outlive, and from which there is complete recovery. In such instances, after wasting, febrile accesses, cough, hæmoptysis, expectoration, and the presence of physical signs indicating a solid

Tubercle absorbed.

* See *Pathological Transactions for* 1862. In this and similar cases the cancer has been reproduced in other organs after years of latency; but the original tumour in the breast entirely disappeared.

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Strumous deposits in children capable of absorption.

deposit in the apex of one lung, the systemic disturbance subsides, the patient regains flesh and strength, and all pectoral symptoms cease. It is also not to be doubted that in children a species of strumous deposit takes place in the lung, which is capable of absorption without having undergone either a cretaceous or horny change, and without having softened. Children with all the physical signs and all the active symptoms of phthisis have rallied almost from the grave, and the abnormal sounds have disappeared, while the general health has been reestablished.*

Conversion of tubercle into cretaceous or horny matters.

In other cases, as is well known, the conversion of tubercle into a cretaceous mass, which is ultimately expectorated, evidences the resistance made by the system to the progress of organic disease. When the effused morbid material is incapable of absorption, it becomes chemically altered; its animal portion is taken up into the system, and the purely earthy salts are finally eliminated. Analogies to this conservative action are to be found in some of the degenerations of tissues, which it is more than probable have a similar end to subserve.

Resistance sufficient to tolerate.

Where absorption or conversion of the morbid material is impossible, the powers of nature are not less seen in the further stages of diseases accompanied by organic changes. If resistance cannot be completed by the removal of deposits in either of these modes, an attempt is made to procure their isolation, and a plastic exudation will often effectually stop the further progress of the morbid action. The adhesions and thickenings of the pleura around portions of a lung, the

Exudations conservative.

* In certain of these cases the deposit of tubercle has been in the bronchial glands, but in others there can be no doubt that the lung itself was affected, the physical signs being of undoubted character and at the base. 'When enlarged glands in a scrofulous patient ultimately disappear, we may conclude almost with certainty that we have witnessed the cure of a tuberculous disease.'—*Carswell.*

seat of tubercle, are highly illustrative. Without them, the smallest deposit, if it soften, may give rise to a fatal pneumothorax, while they also answer another purpose, in limiting the incessant movement of a part undergoing irritation. The interstitial exudation of plastic lymph below and around chronic cavities in the lung is another example; a deposit with marked tendencies to extension being thus walled off and isolated.

Apoplectic cysts.

Analogies to this are found in the cysts with which apoplectic clots are often observed to be surrounded in the brain, and in similar envelopes provided for musket balls in various parts of the body, parenchymatous and muscular.

Cysts around balls.

Softening and formation of cavity to be regarded as resistance to disease.

The occurrence of softening of that form of tubercle which appears incapable of more favourable changes, is to be regarded in a similar light, its expulsion from the system being the end to be achieved. The formation of a cavity in the lung is only a clearing out of all morbid material; at the expense of much structural mischief to the lung, it is true, but the effort is curative in its tendency, and not destructive. This fact was recognised by Laennec. Patients will live for years with such cavities, who would have succumbed to the hectic and wasting inseparable from the softening of a different crop of tubercles. The excavation in the lung can be and is tolerated, and unless in instances of profuse hæmorrhage, or from the supervention of pneumothorax, death never occurs from a single cavity in the lung. A repetition of deposits in other parts of the pulmonary structure, and the consecutive softening of these, together with various secondary lesions, destroy the life which, in the first instance, Nature, in her conservative powers, had essayed to save. Nor are the systemic changes less characteristic of resistance to the progress of chronic morbid changes than the local. The reduction of the solids of the body, the emaciation, muscular waste, and absorption of fat, are necessary (as

Systemic changes characteristic of resistance.

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already stated), in order to establish a balance between the system as a whole, and the organs which are to supply it. In any diminution of respiratory space caused by inflammatory attacks on the lung, bronchi, or pleura, an immediate reduction of the respiratory requirements of the body becomes a necessity, and is accomplished by the waste consequent on fever, and by secretion. The relief in acute bronchitis from purgatives is illustrative of this point, and the most distressing cases of respiratory difficulty from such attacks occur in the robust; those who have been already weakened and thinned by previous illness suffering comparatively little.

Remissions of symptoms.

A remarkable feature in all chronic organic affections is constituted by the remissions which occur in their progress, and which allow time for a favourable reaction from the exhaustion and emaciation by which the patient has been reduced. During these pauses the system recovers, and, by increased activity of the nutritive processes, muscular waste is replaced, the blood is renewed, fat is again formed, and a very decided increase in weight takes place. It is difficult to account for the occurrence of these pauses, otherwise than by assigning them to efforts of the system to build up the losses it has sustained; and theoretically it is possible to conceive that by deposit of morbid material, or by extraordinary and increased secretions (as in the hectic sweatings of phthisis), the blood is freed from impurities with which it has been loaded, and opportunity given for its enrichment by an increase of red corpuscles, and other nutritive constituents.

Examples in phthisis and heart disease.

Examples of these pauses in chronic affections are common enough. They are seen in phthisis remarkably, and in various disorders of the circulation dependent on disease of the walls or valves of the heart. In these two instances it is possible to account for them as arising, in pthhisis, from the causes just stated; and in cardiac obstruction, either from an hypertrophy which counterbalances the

valvular difficulty, or from the terminal portion of the circulation being relieved by an effusion of the serum of the blood (*anasarca*). Nor are organic alterations of the cerebral structure without illustrations of these remissions in symptoms, although brain affections are perhaps more uniform in their progress, however slow, than those of other organs. A fresh accumulation of morbid matter in the blood may (as in gout) induce an exacerbation, and give rise to an 'attack.' And it is indeed easier to account for the access than for the remissions which occur in all affections. To whatever cause they may be due, we are not to overlook the opportunity which they offer in practice for an attempt, which is almost always successful, to assist in the reparative processes by improving the quality of the blood, regulating the secretions, and by judicious and abundant food, and occasionally by stimulants, by free exposure to the open air, and by the moral help of removal and change of air and of scene, to second the curative natural efforts of the system. These are the golden moments, and if from some mistaken theory we overlook them, or through fears of inflammation should persist in a low regimen, and the use of depressing drugs, we are counteracting the attempts to rebuild and repair, towards which the vital system is labouring with all its powers.

Local and constitutional symptoms subside together.

As in cavity of the lung.

It may further be remarked of these remissions that it is almost invariably seen that local mischief and constitutional disorder subside simultaneously. The rapid formation of a cavity in the lung, and the expectoration of the softened tubercle, are accompanied by the most violent constitutional disturbance, and by hectic, which threatens the existence of the patient; yet, in numerous instances, the local irritation ceases. The cavity remains, but almost ceases to secrete; its walls approximate, and in certain instances close up, while, *pari passu* with these structural improvements the patient regains health and

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vigour. The condition of such a person is highly demonstrative of the fact, that nature can tolerate certain lesions of organic structure, and that the general health may continue, under such circumstances, but very slightly impaired.

The intermission period.

It is obviously on the duration of this pause in active symptoms, and cessation of the spread of local mischief, that the length of the patient's life depends; and the prognosis must be delivered mainly from the evidence which the system offers as to its powers of resistance during these periods.

Weakened and reduced, but not exhausted, by the fever and wasting accompanying the early development of organic disease, a cessation of activity in the morbid processes leaves the patient at a standard much below that of health. He is living, in point of nervous, circulating, and respiratory functions, at a lower level. The great industrial centres of the animal economy have received a shock; and, being less abundantly supplied with nutritive material, are not only manufacturing less tissue, but the actions sustained are done with less expenditure of power, and the system goes at half, or it may be, two thirds speed. There is less blood circulated, less blood aerified, less carbon consumed, and many of the secretions are diminished in quantity. The muscular system has been reduced, as is an army which has sustained a defeat. With less waste of tissue daily undergone, there is less production of heat and less toleration of cold. Pallor of skin and of tongue evidence the diminished supply of red corpuscles, and anæmia, with all its characters, is witnessed in varying degrees.

Resistance of the nervous system.

The most important portion of the system to notice is the nervous. It is not the earliest to feel and record mischief in very chronic affections, and perhaps it is the last to yield; but on its vigour depends the duration of the case. Its sensibility and power as a regulator of

other vital actions, and its very intimate connection with the integrity of those functions of the body which are controlled by the moral and intellectual, are much concerned in the prolongation of chronic disease. In as far as mental configuration is modified by nervous power, the latter becomes a powerful resister of morbid actions. The vigorous will maintaining control over the body is seen in our most prolonged cases, and seems to be the inseparable condition of great vitality opposing bodily weakness. The observation will, doubtless, recall to many readers the noble intellects and high generous spirits, self-denying and thoughtless to recklessness of physical suffering, whom we have, with wonder and admiration, seen compelling an emaciated and almost useless body to do its daily work, till death has at last appeared to come more by a relaxation of the will to live than by a victory of the physical body over the living soul. 'Not until disease is shaped and realised into something which can be seen or heard or touched, and can be called by a name, is it wont to engage the nervous system perilously,' says Latham. And so to the end; it is the last element of vitality in the field of struggle and the last to yield.

Heart's action the index of nervous power.

'The nervous system has the heart for its gnomon or dial of the clock,' says the same author; and extreme rapidity of the heart's action, while it has a most grave import in acute disease, is also an accurate measure of the failure of nervous power in chronic affections. The acceleration of the pulse during a febrile attack is not here alluded to; but a uniform high range of pulse, deficient in force, which, although it vary in number, is never below a high rate. It is rarely under 100, and may run up from this to 140, or till it is impossible to be reckoned; and there is no more disastrous symptom. In various chronic affections the muscular walls of the heart are thinned and softened; but, unless this has taken place, the action of the heart in these remissions

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of symptoms falls to a more healthy average, and the pulse acquires fulness.

Secretions.

As a rule, the secretions are diminished during intermissions in chronic diseases. The uterine secretion is a marked instance of this, and the catamenia are often absent, and almost always lessened in amount. May not this subserve the purpose of preventing undue waste of blood? In connection with this it may be remarked, that generative activity will often remain till the very close of chronic organic affections; and the fact is rather opposed to the above statement; but this function is so influenced by various vital and emotional conditions, as to justify our considering it exceptional. Its over-activity in such cases is certainly not conducive to prolongation.

Acute attacks on other organs.

The occasional occurrence of acute attacks on other organs than that which has given a character to the illness, is generally witnessed in this period of remission, as, in the course of a prolonged phthisis in a gouty subject, the gouty fit will not commonly occur while the patient is undergoing hectic from softening tubercle, but comes on in the intermission period of which we are speaking. So of skin diseases, rheumatism, or any of the complications which may be called of blood origin. The purely secondary disorders, which stand in the relation which intestinal ulceration holds to tubercle in the lung, are not here alluded to. They occur in any period of the illness, and occasionally, but not commonly, alternate with the primary affection. Their advent may be regarded as an extension of disease, and breaks up the intermission.

Increase of weight from improved nutrition.

The nutritive powers of the system, fortified by the improved quality of blood and by recruited nervous power, soon evidence the vital tendency to repair; and increase of weight almost invariably occurs, unless the system be so weakened that it cannot rise beyond a certain level. In 3,872 cases of phthisis examined

during a three months' stay in the Hospital for Consumption (*2nd Med. Report*, 1863), it was found that 2,487 had an increase of weight of from 5 to 15 lbs., while 1,385 had lost weight to a similar amount, the excess in number of those who gained over those who lost being 1,102.

The system at a low par.

Pauses in local mischief and in febrile or other constitutional disturbance are not, however, invariably accompanied by increase in nutritive power and repair of the tissues. Some of our cases are standing still, and, in spite of every effort to take advantage of the cessation of activity in the disease, the system seems to remain simply tolerant of the morbid condition, and no more. Like a vessel 'lying-to' at sea in a light wind, no progress is made and none is lost, except in that inevitable drifting on the sea of time. We have often in practice had occasion to notice such cases, in which medical treatment (as tonics) seems thrown away, and we are compelled to regard our work with but little complacency. Nevertheless these instances (which are fortunately rare) are not without encouragement, when we remember what might be, and the student of chronic disease has much to learn from them. They illustrate the possibility of maintaining an exact balance between waste and production; and, if no extra demand be made on the system while in this condition, it may preserve such balance for an indefinite period. On the other hand, any sudden call for an outlay of strength may prove fatal. A journey, an unusual emotion, the removal from a hospital, often extinguishes the flicker of life.*

A slight disturbance fatal.

* In the Hospital for Consumption this has often been observed. One of my patients having taken it into his head to leave, expired while stooping to put on his stockings. Another died while on his way to the gate. A poor fellow whose life had been singularly prolonged, but who was by no means in an advanced stage of emaciation, died a few days after his removal to his home, although he had been able to walk about the wards and grounds before leaving, and was sufficiently provided with all comforts and even luxuries in his lodging.

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Duration of the intermission.

Causes on which it depends.

The duration of the intermission period is of course uncertain, and its extension or termination is due to many causes. While it lasts, it is only a toleration of disease; when it terminates, it is either by a renewal or by an extension of the morbid processes. Its duration depends on a variety of causes, which concurrently promote the vitality of the system. An originally good constitution, the non-inheritance of special disease, the direct inheritance of longevity (as when parents and grandparents have lived to a great age); the nature, and of course the limited extent, of local disease; the integrity of other organs, and of the sum of vital actions represented in digestion; the absence of fever; a vigorous nervous system, as indicated by a uniformly quiet pulse; a tranquil and regulated but powerful will may be enumerated among the causes which tend to prolong the duration of the intermission in chronic organic disease. To these must be added considerations derived from *age*. Should the patient be at the period of growth, the peril is greater, the chances of duration are less. Organic changes then advance with such rapidity, that the diseased process marches *pari passu* with the nutrition of the body. The blood is charged with material for the production and sustainment of new tissues, and the organic elements destined for growth are readily perverted into morbid matter. The essence of some chemical formations is here; and, without affirming that their origin is invariably connected with altered nutrition, it may be safely held that to an imperfectly formed or deficiently organised plasma we can trace the elements of tubercle and of other morbid deposits of low vitality. The period of growth then, and of rapid renewal of tissues, is opposed to the long duration of a tolerance of already existing organic disease. The tubercle, or the cancer, or the morbid growth, is assailed by an abounding circulation and an active nervous power; and its removal or ab-

Effects of age on duration.

Period of growth.

sorption is attempted by increased vascular action and efforts in their nature inflammatory. And these efforts partake of the character of those natural processes for the nutrition and repair of the body which are inherent to the age of growth. It is true that certain instances of great toleration of disease are found at this period, and it is conceivable that the very processes which are destructive in some may, by their excessive activity, overpower the local mischief in others, and cause the absorption of the offending substance. Instances of this will be given, but meanwhile the general fact must be sustained, that the duration of disease, and the tolerance manifested by the system in these intermissions now under consideration, are less at the period of growth, and much increased at an age when the body has completed its natural processes of increase, and has only to furnish material for the repair of daily loss.

Very chronic disease found in persons over 40.

Very chronic affections are found as a rule in individuals over 40 years of age, and age must enter as a distinct element into all our calculations regarding the prolongation of any chronic disease, or the duration of the pauses between its attacks which we have been noticing. As a whole, then, it may be stated that everything which tends to promote slowness in organic changes, healthy or diseased, is also conducive to prolongation of the intermissions or pauses which occur in the progress of chronic diseases of organs.

Intermission ends.

The intermission ends either by a renewal and extension of the original morbid process, or by the addition of secondary attacks on other parts, or by both of these concurrently. The more common of these modes is the first. From a certain accumulation of morbid matter in the blood, due to the original causes of contamination, and to the detritus of the material already deposited, or from some local congestion determining a degree of inflammatory activity in the part already affected, the local disease becomes again a

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source of irritation to the system, or the blood again elaborates unhealthy material in the same localities as formerly. In cases where the morbid matter has an inherent tendency to soften and break up (as in yellow tubercle), the resumption of activity in the symptoms is often due to a commencement of this process, or a new and extended deposition may take place.

Secondary disorders.

The secondary organic disorders are those which clearly arise as sequences to the primary structural affection. They may be due to the same cause, and only indicate a real extension of the morbid influence, as in the tubercular deposits in the peritoneum, or mucous glands of the intestine, in phthisis; or they may occur from the intimate connection of the functions of two distinct organs, allied by their circulation and nutrition, as in engorgement of the liver and kidneys from valvular disease of the heart. In certain rare cases contiguity of organs seems to predispose them to a simple extension of morbid action from one to the other; as we have seen in pleural inflammation of the right side from chronic hepatic disease.

Secondary sympathetic disorders.

Secondary sympathetic diseases of structure, the two organs affected being remote from each other, must be very rare, if at all possible. Such cases as appear to belong to this class are invariably due to the same primary cause, and that probably of blood origin.

The longer delayed the greater the duration.

The order in which secondary diseases occur is determined by the operation of many causes, some of which are peculiar to the disintegration of the organ primarily affected, and others to the yielding of the system to the morbid action. As a rule, it may be stated that the longer the development of secondary disease is delayed the greater will be the ultimate prolongation of the case, and the more remote the danger. This principle is applicable to secondary disease in all the forms mentioned. As will be seen, our most prolonged cases of phthisis are those in which

the organic complications are absent till the very last; while on the other hand the most rapid form of consumption is that where many organs are engaged simultaneously in the morbid action, and where the (so called) secondary attacks, as diarrhœa and the laryngeal complication, assume a formidable importance almost at the beginning of the affection.

May occur with increase of primary disorder;

Secondary diseases of organs may or may not be attended by an increase in the local extent of the primary affection. When they are so, the danger is greatly multiplied. They may also be coincident with an advance in the stage of the primary local disease, the extent remaining unaltered. This is the more common of the two conditions, and the least perilous for the moment, although ultimately of great importance as an element for calculating the duration of a given case. The union of the two states, extension of structural disease and a downward step in the condition of that already existing, coincident with any secondary attack on a distant organ, forms the worst group of symptoms which can occur.

Or alternate with primary disorder;

In certain cases a secondary disease will leave the primary unaffected, or even relieved, the two appearing to alternate. Although theoretically more favourable than the concurrence of both a primary and a secondary attack, it has been found in practice that the system is rapidly reduced by alternations of this kind. A smart diarrhœa may seem for the time to relieve the sweating from hectic, or to lessen the amount of expectoration; but it will invariably be found that the strength is lowered, and the progress of the case hastened by such an occurrence, even more than by the coexistence of the two.

Disturbances of single functions easily tolerated.

A chronic disturbance of any single function or organ may, so long as it is single, be tolerated with wonderful impunity, and the disturbance of general health be often so slight as scarcely to interfere with the usual

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habits and duties of life; and this truth is indeed the key to the prognosis to be delivered in most cases of prolonged disease. The complications and secondary affections it is which kill; the machine may bear the incapacity or even the destruction of one apparently most vital organ, but when a second of infinitely less importance in the economy is attacked, the systemic derangement is not found to be in the simple ratio of the vitality or utility of such organ, but rather has relation to the order in which it stands with regard to the primary disease. Numerous examples of this will have occurred to every one.

The relative danger of a case of diseased liver, and of the same with structural disorder of the kidney superadded; the position of a patient with valvular obstruction of a cardiac orifice, as compared with the same with disease of liver or kidney, and the import of a complication of all three; a well limited cavity in the lung for the sole affection, and the same with evidence of disease in the larynx or ileum—these form medical problems not difficult to solve, and in their solution help us to assign to secondary affections, a definite value in prognosis.

This method of reasoning it is which alone can give accuracy to our attempts at forming a rational estimate of the danger and import of any given case of chronic disease. All the phenomena exhibited by the system —those which we can most accurately define as local, as well as those which, from their more closely affecting vital actions, we call general, have an import, and a value, which can only be estimated by viewing them as a whole. Their relation to each other is a primary consideration in all attempts at prognosis, and truly constitutes the highest department of the practice of medicine. The neglect of this method of studying disease has led to the greatest abuses, the most opposite opinions on disease, and the most shameful errors in

Systemic and local disorder to be studied together.

practice. Were it universally adopted, we should no longer have complaints that specialism leads to narrow pathological views, for the study of individual classes of disease could never then be limited to the local organ affected, but would of necessity embrace every possible derangement of system. Localisation may be possible in general pathology, but separation is clearly inadmissible. We may define the spot diseased, or the organ primarily attacked, but we can never view our patient as other than a living study, with a portion of a complex and inseparable mechanism, whose very condition of existence is unity, thrown into disorder; and our interpretation of the case, our reasoning on its present and its probable future, and our proposed remedies, must all have relation to the entireness of the organism affected.

Mistakes about specialism.

The final stage of all organic affections is of course approached when the system takes up a continuous irritative action, indicated by incessantly high pulse, repeated and almost continuous febrile accesses, and uninterrupted waste of the tissues. The advance of local disease may be in direct proportion to this disturbance of vital power, and is generally found to be so, but there are numerous instances in which the organic and primary affection is not in its extent a measure of the danger. More commonly it is to a variety of complications that the fatal issue is due. A sudden diarrhœa, a slight hæmorrhage, will be sufficient to disturb a balance which has long been sustained with difficulty. Another form of yielding is that in which there is a gradual, almost imperceptible, decay of all the vital powers, and it would be impossible to say that death was due to any single organic lesion or predominant symptom. With mental power sustained, with bodily strength at a minimum, and extreme wasting of the tissues, the final days of such cases often seem an armistice won from death by an effort of the

The final stage.

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will alone. Resistance has fought the battle, and only succumbs when starved out.

Indications for treatment to be gathered from natural processes.

It is impossible to close our observations on the mode of resistance of the system to organic diseases, without a word or two on the indications for treatment arising from the above considerations. Throwing aside at once all idea of specific or direct counteracters of organic mischief, our remedial efforts must be directed in accordance with the struggle which the vital organism as a whole is making against disease. We must study the natural modes of resistance, and from a knowledge of the mechanism employed, and of the methods practised by the system unassisted by art, endeavour to afford help by imitating and strengthening and forwarding natural efforts at relief. We must also never stand in the way of curative indications in the *modus operandi* of nature. It is not proposed that we should sit down as hopeless and helpless watchers of the progress of disease, any more than it is pretended that nature requires no help, and is sufficient for all emergencies. There is very much to be done, but it must be done wisely if efficiency be desired. Febrile efforts at reducing the system, the physiological value and import of waste, the uses of hæmorrhages and of secretion, have been dwelt on; but it is not pretended that the patient is to be allowed to succumb to fever, or the wasting of the system to proceed to marasmus, or local congestions to destroy, when much timely help can be brought in to control and modify the excessive actions of the system by which life is endangered. When the local irritation is a measure of the constitutional suffering, depletion will often remove congestion and relieve excessive fever. The constituents of the blood can be altered by chemical means, as salines, and secretions can be increased when deficient, or lessened if excessive, and indications for these various purposes are always to be gathered from the natural efforts

Excessive fever to be combated.

Congestions relieved by depletion.

manifested at the time, it being in vain, for instance, to attempt to administer tonics and nutrients of a high class (as the oils) when the system is working in the other direction, and much febrile action is present.

Nutrition of the tissues helped in the intermission period.

In the intermission period, during the natural pause for purposes of repair, we can be of the highest use, and treatment then assumes an importance and exhibits a value which reward the patience of the physician, and prolong the life of the patient. It has been calculated by good authorities, that the duration of life in phthisis has been nearly doubled since the introduction of cod oil as a remedy; but they properly dwell more on the aids which good diet, pure air, and improved sanitary habits have brought to bear against consumption. It has been shown that this period is hopeful for cure, for repair, and for resistance; and it has been sought to establish that nature herself indicates, by the cessation of morbid processes, and increased nutritive energy during these pauses, that the resistance of the system can be effectually aided by judicious assistance, if it be afforded at the right time and in the proper direction.

CHAPTER IV.

PHTHISIS—A DISEASE OF THE SYSTEM.

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In pursuance of our object, which is to obtain such evidence about any given case that we shall be able to prognosticate its future with the greatest amount of probability, it will be necessary to consider the disease first in a general point of view before proceeding to analyse its different modes of manifestation.

It is also necessary for its full understanding to state what is known practically about its nature and origin.

Is tubercle a disease of local origin?

The first question which meets us is, whether tubercle in the lung is a disease of local origin taking its rise from some error of nutrition in the organ, a false growth, superadded deposit, or degradation of existing tissue? or a disorder of a general character, which has only attained a somewhat advanced stage when we are able to detect its localisation in the lung? Freed from technical expressions this seems to be a fair statement of the points at issue.

Arguments in favour of its being of local origin.

The arguments of a practical kind in favour of the former view may be thus stated;—

1st. The disease often arises apparently without a general cause. No derangement of health has preceded the deposit in the lung.

2nd. The fever and emaciation have been secondary in point of time to the local phenomena, and have resulted mainly from the irritative action on the system of a morbid deposit already established in a vital organ.

3rd. A hæmoptysis has appeared in many cases to give rise to tubercle in the lung.

4th. The close relation observable between the amount and the stage of the lung deposit, and the general symptoms.

Arguments against its local origin.

The reply to these arguments will be best found in the detailed history of the disease which follows, in which it will be maintained from observation that a preexisting disorder of health is invariably present before there is any evidence of deposit in the lung; that a sub-febrile state is characteristic of the impending mischief, distinct from the well-known hectic accompanying suppuration or irritation of vital organs; that the hæmoptysis is not a cause, but a consequence, of tubercle already existing; and that, while a certain relation between the stage of lung disease and the general symptoms is admitted, there is still no invariable correspondence between its extent and the general *constitutional* disturbance.

Alteration in health before local disease occurs.

That a peculiar alteration in the health occurs preceding the local manifestation of tubercle in the lung admits of little doubt. It is a subject involved in much obscurity, and the evidence on which its existence rests is of a character appreciable only by those who have themselves undertaken its study earnestly and impartially.

Symptoms before physical signs.

There are, in other words, symptoms before there are physical signs; and, still further, there are symptoms not referable to any disease of the lung so far as the function of respiration is concerned, but clearly indicative of a general disorder of the system. That these symptoms, even when grouped as they commonly are before an attack of tubercle, are not invariably followed by the morbid result, is, though unsatisfactory, still no argument against the general fact. Tubercle may be invariably preceded by certain symptoms, but these symptoms may not, when present, be invariably followed by the disease in the lung.

Constitu-

The earliest of all this group is emaciation. The

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tional symptoms.

rapid waste of tissues is a perilous process to the system, and it may be regarded as a period in systemic changes when some form of organic disease is very likely to occur.

Emaciation; its physiological import.

Let us regard the physiological import of emaciation. In the normal working of the system, the nutritive supply and the waste are pretty nearly balanced. The pabulum furnished to the blood is, under ordinary circumstances, amply sufficient for its outlay. The simplest form of innutrition (starvation) is followed by rapid waste of tissues, from which, if not too prolonged, there is almost as rapid recovery; also the organs concerned in assimilation may be so disordered as practically to lead to the same result as an insufficient supply of food, by depriving the blood of its necessary nutrient supply. But in the emaciation preceding the deposit of tubercle the defect is not so easily remedied; quantity ceases at once to be the desideratum, and quality rises to its position as the most important element in the material to sustain organic life. Whatever be the nature of the changes which we have called secondary assimilation, they are demonstrable to be the nearest physical phenomena to those which are more especially under vital control, and whose deficiency or imperfection seems to deprive the latter power of its capability of efficient action. Even an abundance of the nutritive material, insufficiently or imperfectly altered by the secondary processes, is, in its effects, equivalent, or even more than equivalent, to a positive failure in its quantity. The result in both cases is the same—a preponderance of waste over supply. Organic structure requires for its nutrition a highly elaborate plasma; and, if this be not furnished, it seems probable that the first step in the ensuing disorder would be a simple deficiency of nutrition,—the imperfect material being declined, and a proportionate waste ensuing.

Deficiency in quantity of nutritive material.

Alterations in quality.

The imperfect material declined by the tissues.

Should secretion from the various organs which act

as safety-valves in such emergencies (kidneys, skin, lungs, and liver) be insufficient to remove the excess, the immediate result of such a state of things would be an overloading of the blood (impurity) with an excess of material imperfectly prepared for nutrition.* The tissues, on the other hand, at first make a selection in the pabulum offered, and decline to appropriate that which is unfitted to their use. Simple innutrition is, therefore, the earliest link in the chain of downward action, and hence the resulting emaciation. The body, and especially the vital organs, are not as yet renewing their daily waste by bad material, but subsist by selecting only that which is appropriate; just as an invalid might, at an elaborate table spread for his entertainment, select only the fitting articles, and should find these but limited in supply.

Impurity results.

For a long time the system will submit to be partially nourished rather than to be badly nourished. It will choose rather a deficient supply, than be compelled to appropriate unwholesome materials; and it appears to be this selective tendency which for so long a time preserves the patient from the destructive changes which constitute consumption.

System will submit to be partially rather than to be badly nourished.

Early emaciation is, therefore, the result of a conservative process, which, while it weakens and emaciates, retains the organs comparatively sound. The ultimate changes by which, in the tubercular habit, deposits take place in the brain, heart, intestines, mucous and serous membranes, and in the bones, are delayed till the blood has become so overcharged with impurities, and the resisting powers of the system so enfeebled, that organic life yields in the struggle.

* As is well known, Professor Bennet refers this disorder of assimilation to the early stages of digestion, assigning acidity in the *primæ viæ* as a direct cause of imperfect conversion of the albuminous matters, the alkalinity of the salivary and pancreatic secretions being neutralised, and rendered incapable of preparing fat to be assimilated.

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Modus operandi of innutrition.

While the tissues are thus badly nourished, partly from their own selective powers, the blood becomes either daily more overloaded with impurities, or, by a vigorous effort, discharges them. The daily waste continuing, although at a diminished rate, throws an excess of used material into the circulation,—should it be oxidised and separated, we have recovery; but it may be that neither is possible, and it is deposited in the form of tubercle. To some observers, the disease begins here; but the preceding considerations lead to a deeper study of causes. It is not when the enemy has (silently, it may be) possessed himself of the capital that we are to cry out news of an invasion.

Nutritive material of blood derived from two sources.

But, again, the nutritive material of the blood is derived from two sources—one from without, which is daily ministered to by food; and one from within, supplied through the lymphatics from the constant disintegration of existing tissues of the body. Still more, absorption is, as we know, increased by innutrition; probably for the purpose of throwing the debris of structure into the blood, and thus by enriching it, offering to the system generally, a fluid more capable of supplying its wants. In the event of disorder of the assimilating function, we thus find all the organs suffering from an alteration in the quality of nutritive blood, their own natural waste continuing, and even increased, and the vital fluid itself progressively impoverished by having its ingredients furnished with a disproportionate lymphatic supply, whilst its more substantial support from without is shortened in quantity and deteriorated in quality. Emaciation, therefore, has a deeper meaning than merely a thinning of the tissues, for the blood of necessity becomes overcharged with disintegrated and reduced materials, which unfit it for sustaining the system at its customary par of nutrition. We can thus see how emaciation becomes a progressive

process, and is itself a means of overcharging the blood with the detritus of tissues.

An exit necessary.

Again, in rapid thinning there must be an exit found from the system for an excess of fibrinated material and organs whose habitual work is thus increased become over-taxed. Should they yield and imperfectly convert the surplus, new embarrassment is superadded; and at this point it seems theoretically probable, and almost practically proved, that organic disease begins. Thus the kidneys, the liver, and the lungs may find the conversion of carbon into their respective excretions of urea, bile, and carbonic acid, an over-task; and in the progressive disorder of functions which ensues from hypersecretion to congestion, from congestion to diminished secretion, and from this to structural changes, we may recognise and account for a chain of morbid actions.

Emaciation alone is not sufficient to induce disease; but the rapid reduction of the volume of the body, implying, as it does, a previous derangement of the assimilating processes, must be a vital action fraught with danger to all the decarbonising organs.

The spare habit.

Persons of spare habit and a temperate manner of life are able to sustain fatigue and to make prolonged exertions, which those more robust and fleshy would find it impossible to undergo; and such individuals bear loss of weight, even of rapid occurrence (as in acute illness) with comparative impunity. The corpulent, with flabby ill-organised tissues, are, on the contrary, thrown into immediate peril by diseases promoting rapid absorption of the structures, as fevers, acute inflammations, and severe mechanical injuries, which demand a lowered diet for their treatment. It may be thus seen that the system can ill support a sudden or even moderately rapid alteration of its own volume; and the considerations given above may help us to understand the *rationale* of the embarrassment.

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Hæmoptysis a cause.

The frequent occurrence of hæmoptysis in phthisis has given it a place among the symptoms of that disease of almost undue importance. A discussion has even arisen on the question if the hæmorrhage itself has not been an exciting cause of the disease. It is perhaps not necessary to enter deeply on this subject, as modern pathologists seem agreed on the point, but the possible concurrence of congestion of the lung preceding or accompanying the deposit of tubercle, is a practical point demanding our best powers of investigation. That it does exist in very many cases is proved by the researches of our best pathologists, and the consequent rule of practice leading to local depletion has of late been too much disregarded. That the simple flow of blood from the lung, whether the result of a purely mechanical lesion of structure from the pressure of a foreign morbid substance, or of an exudation from overcharged capillaries, or of a rupture of some large branch of the pulmonary vessels, can, *per se*, be in any degree a causative agent in the production of tubercle, we must take leave briefly to deny. There exist no direct arguments, nor any physical analogies, to justify such a theory.

The supposed relation between symptoms and local disease an argument.

The close relation observable between the amount and the stage of lung disease and the general symptoms has been urged as an argument in favour of the theory that phthisis originates in pulmonary disease, from which follow, and on which depend, the constitutional phenomena.

This relation not invariable.

First, it is not practically found that such relation exists. A very small amount of deposit in the lung may give rise to excessive hectic; and, as already stated, a large degree of constitutional mischief may be present without any organic change. These discrepancies are not exceptions, but are frequently met with. A cavity in the lung once established may give rise to so little fever and distress, and the patient may

wear so much the aspect of health, as to deceive any one but an auscultator; while a few tubercles softening may almost exhaust the patient with irritative fever. This want of correspondence between physical signs and symptoms is of daily occurrence in practice, and can but lead to one deduction, namely, that the extent of local mischief is rarely accurately represented by the symptoms.

Summary of these views.

A summary of the whole argument regarding the constitutional or local origin of phthisis must include all the considerations alluded to. It is to be maintained that the disease never arises without a preceding disorder of general health; that the fever and emaciation may, and frequently do, indicate established local mischief, but that they are not found invariably in this relation; that it has never been demonstrated that a hæmoptysis has given rise to tubercle in the lung, and that all arguments derived from analogy are opposed to this view; and, finally, that there is no invariable direct relation, but a very constant difference, observed between the amount of local mischief and the intensity of constitutional disturbance.

Possible origin of tubercle from inflammation.

There still remains to be examined the evidence regarding the possible origin of phthisis from purely inflammatory attacks of the lung structure. Can pneumonia and bronchitis in their simple forms give rise to tubercle in the lung? It would appear that this important question may be safely answered in the negative. A pneumonia occurring in an unhealthy subject undoubtedly often leads to tubercle. In such individuals the consolidation of the lung consists of a lower and less organised material than that which is effused in healthy persons, and is itself akin to, or is with great facility converted into, tubercle. But this fact, instead of being in favour of the theory of the local origin of phthisis stands as evidence against it; as it is plain that the morbid predisposition existed before

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Pneumonia does not end in tubercle, unless there be constitutional taint.

the local disorder, and that the latter would never have been developed but for the constitutional taint. If an inflammation of the simple kind were to result in tubercle, what comes of the countless cases of pneumonia which terminate in a perfect recovery? It is common enough and highly interesting to watch these cases through their different stages up to that in which a complete restoration of the normal physical condition of the lung is attained. But is the tubercular deposit due to an inflammatory action in the lung tissue, which falls short of that which could fairly be called a pneumonia, and is limited to the spot in which tubercle is developed? In answer to this we may state that there is abundant anatomical evidence that tubercle may be infiltrated into the lung without the slightest degree of inflammation, and that as the major degrees of inflammatory action are only capable of assuming a tubercular form where the predisposing habit of body has existed, so we may fairly argue that a minor degree of the same disorder shall be guided by the same laws. In many instances, however, much congestion of the lung accompanies the first deposit of tubercle, but this is surely due to the tubercle and not the tubercle to the inflammation. The febrile condition of the system in the early stages of phthisis is often the measure of the irritation of the lung tissue, and can be best relieved by local depletion; but we have here an extraneous body acting as an irritant, and quite sufficient by its pressure to account for the phenomena of congestion. We think also that it is proved that the febrile action precedes the local disorder, and is evidence of the constitutional crasis which produces it. On the whole, considering that the ordinary history of acute pneumonia is recovery, and that the local congestion of the lung* in

There may be tubercle without inflammation.

Local congestion of the lung due to the tubercle.

* 'In textures surrounding tubercle engaged in incipient softening, no trace of inflammation is generally discoverable.'—*Rokitansky*, vol. i.

phthisis may be due to the irritation of the tubercle itself, we are bound to conclude that while the earliest exudation of the latter is often accompanied by congestion of the neighbouring tissues, we must assign some other cause for its production.

Bronchitis a supposed cause.

To those who favour the theory of the epithelial origin of tubercle, it may appear possible that bronchitis may be an originating cause, or, at least, that a sub-inflammatory state of the mucous membrane of the smaller tubes may cause such structural alterations as to give rise to the deposit in the lung. With the theory in question we are not now dealing, but the experience of practice forbids this mode of accounting for phthisis. Consumption is not found to be fairly traceable to irritation of the bronchial membrane. Ordinary bronchitis is not its antecedent; and cough, without preceding catarrh, is its common history. Louis says, 'a very small number of patients referred, with a fair amount of precision, the occurrence of first symptoms of cold to 24, 36, 48 hours after the action of the cause to which they assigned it.' Cough also may be entirely absent in the premonitory and in the first stage of phthisis, and in latent cases may be unknown to the patient for months and even years.

Habit of body in bronchitis and consumption different.

The peculiar habit of body which is prone to attacks of bronchitis is by no means the phthisical, and that constitution which tends to the induction of emphysema of the lung (and closely allied to bronchitis) seems almost antagonistic to tubercle. The well-known shapes of the chest in these diseases, which, although not universal, are still typical and characteristic, and therefore highly distinctive, are opposed in almost all their measurements and aspects. The long and flat chest of tubercle stands in contrast to the rounded short build of bronchitis. Bronchitis is often superadded to phthisis, and a minor degree of it is always present in the active form of the disease; but these complications are due to the local irritation

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in the bronchial tubes from tubercle, and not to a susceptibility to inflammatory action peculiar to the phthisical. Finally, the consumptive patient is not more liable than others to take cold, and bears exposure to the air, even when cold, with sometimes remarkable impunity. In epidemics of influenza, which we know to attack those with a peculiarly sensitive bronchial membrane, the phthisical so often escape as to lead to the supposition that they have acquired an immunity from such attacks. The popular idea opposes this, but the fear of 'cold catching' is not verified by observation of the consumptive in numbers. The delicate girl, who has been wasting for months without cough, arrives at the period when softening occurs, or the bronchial membrane is irritated, and is said to have taken cold; but this is not strictly the case. A common catarrh is easily thrown off by the consumptive, and an acute bronchitis is a rare occurrence. Fever and wasting are the early symptoms of phthisis, and not cough of a catarrhal character. Such are some of the considerations which seem to contradict the theory that tubercle is due to bronchitis. Authorities are also pretty well agreed upon this point.*

The consumptive not peculiarly liable to take cold.

That phthisis is not a merely local disease is abundantly proved by the varied phenomena accompanying its development and history. That it is not a merely lung disease is equally obvious. The nature of its earliest symptoms, which point to a deeply seated constitutional disturbance, has been noticed; it remains to adduce evidence from its general characters. Its concurrence in different organs at the same time is itself a manifestation of a producing cause due to systemic disorder. That the lung only exhibits a higher capacity for its development is a well-known pathological law; and the axiom of Louis, that after

Phthisis not merely a lung disease.

Its concurrence in different organs.

* Rokitansky; Louis, Ed. Syd. p. 156; Cotton, ed. 1852.

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the age of fifteen the existence of tubercles in the lungs forms a necessary condition to their development elsewhere, is evidence of the constitutional origin of the disease. The post-mortem appearances in fatal cases exhibit the multiform action of this destructive agent.* No organ escapes, and the patient dies not with one local affection, but with many.

Law o Louis.

Post-mortem evidence.

The constitutional symptoms exhibit a special character, and are quite distinct from the disorder accompanying a pure inflammation of the lung. The early subfebrile condition, emaciation out of all proportion to the local disease, hectic of severity often present before softening, the remission occurring in its course, constitute a group of symptoms characteristic and sufficient in many cases to indicate the affection long before physical signs can aid us. The predisposing causes of the disease may also be here mentioned, and will here-

Systemic disorder peculiar to phthisis.

* Morbid conditions of other organs coexistent with tubercle in the lungs:—

	Of cases.
Pleura inflammation, false membranes, effusion	$\frac{1}{6}$
Trachea ulcerations	$\frac{1}{3}$
Larynx epiglottis	$\frac{1}{5}$
Pericardial effusion, heart softened	$\frac{1}{10}$
Stomach distended—softened	$\frac{1}{10}$
— (perfectly healthy, $\frac{1}{5}$)	
Intestine, small, ulcerated	$\frac{5}{6}$
— large, —	nearly the same
Lymphatic glands, tubercular	$\frac{1}{4}$
Liver fatty	$\frac{1}{3}$
Spleen softened, Kidneys, tubercles	$\frac{1}{6}$
Peritoneum effusion	$\frac{1}{4}$

—*Louis, Ed., Sydenham.*

Inflammation, lungs and pleura	$\frac{1}{10}$
Ulcer larynx, epiglottis	$\frac{1}{5}$
Pericardial effusion	$\frac{1}{10}$
Heart, diseased (Andral)	$\frac{2}{3}$
Peritoneal effusion	$\frac{1}{4}$
Stomach sound only in $\frac{1}{5}$	

—*Laennec.*

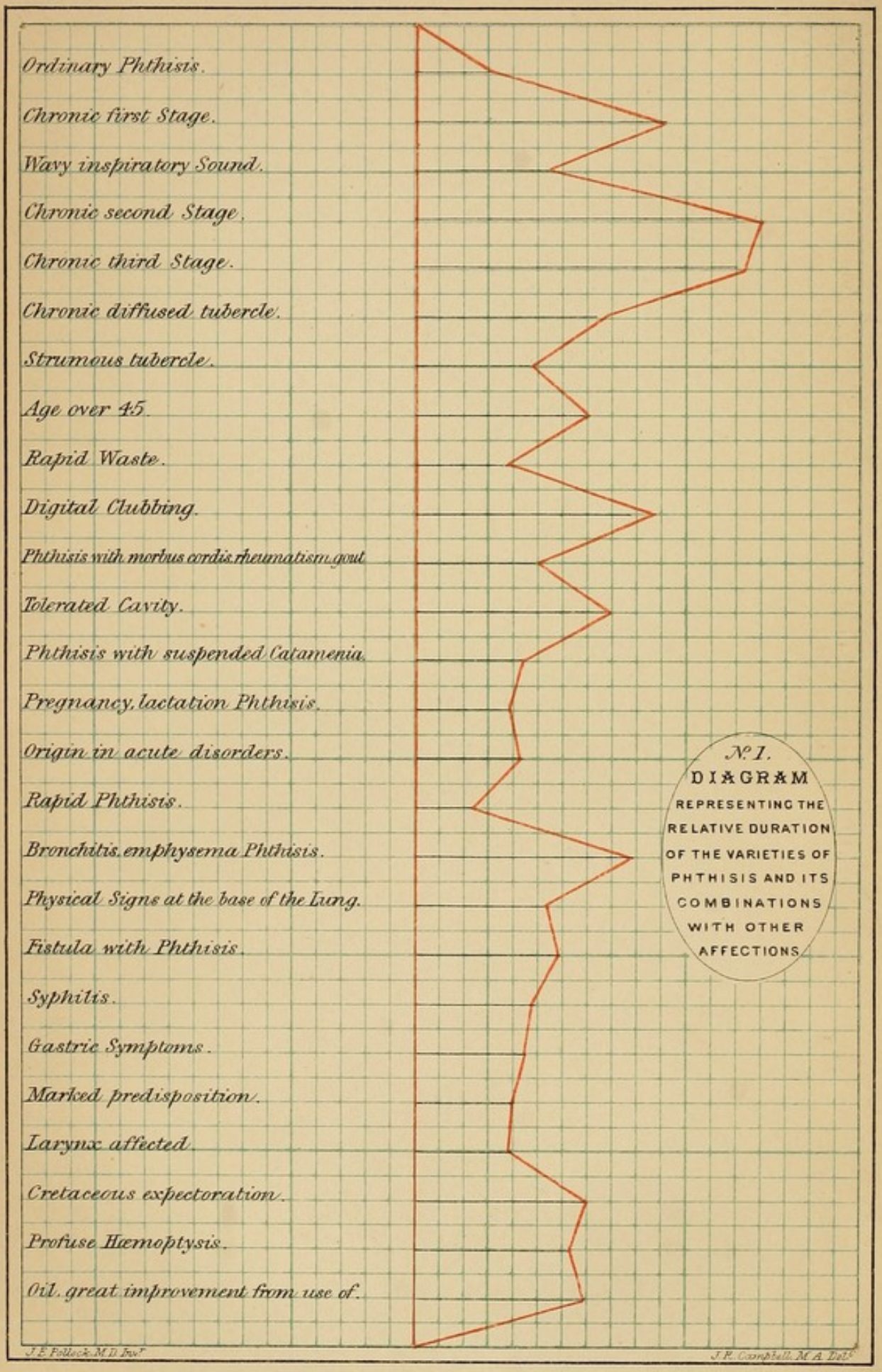
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Predisposing causes of Phthisis.

after be dwelt upon more in detail. An examination of many thousand cases shows that in-door and sedentary pursuits are attended by a marked proclivity to consumption, and this not only from interference with the respiratory function, but from originating a deficiency in the great processes of nutrition and sanguification. Whatever depresses vital power—exhausting passions, grief, long-continued drains on the system, bad or insufficient food, the close air of rooms—induces the cachexia, which is in itself a systemic disorder.

Fixed conclusions on the nature of Phthisis essential to prognosis.

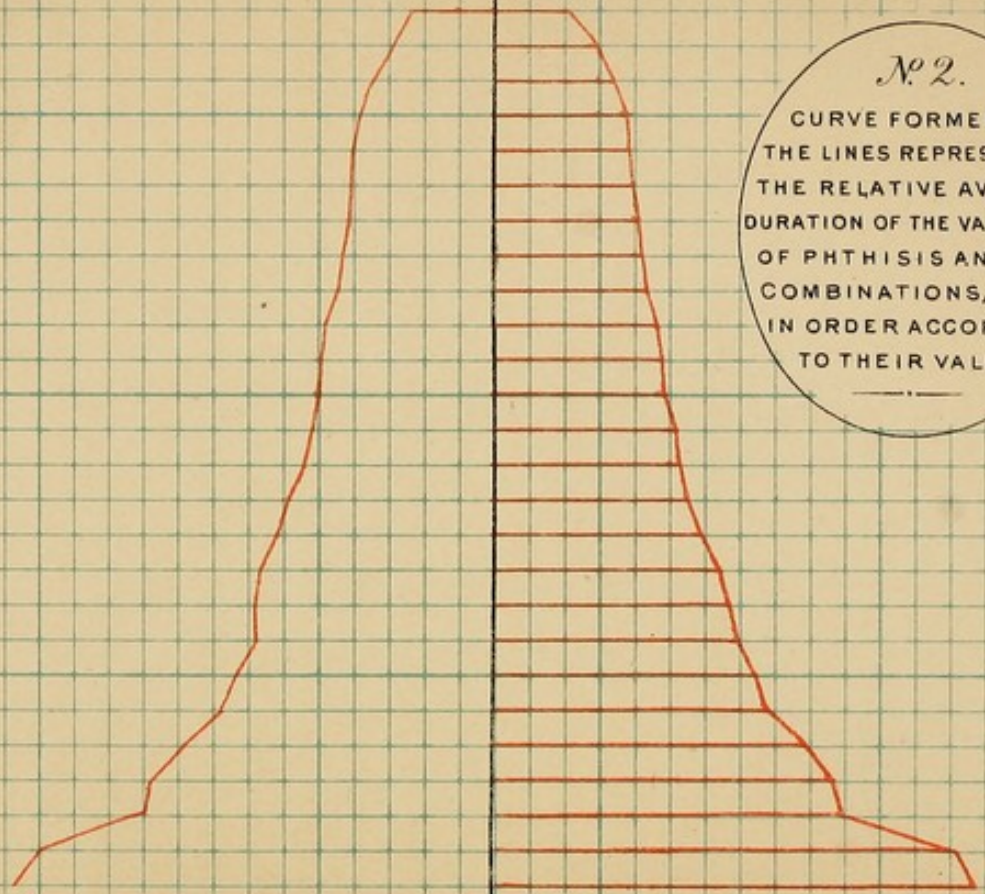
In treating of prognosis it seems highly essential to start with fixed conclusions and certain knowledge of the nature of the affection. If we are to regard phthisis as a merely local disease, giving rise, in its progress, to systemic disturbance, our measure of the danger must be gathered from the amount and the stage of disease in the lung. From this course have arisen and daily continue to arise innumerable mistakes, prejudicial to the character of the medical attendant, and injurious to the best interests of the patient. How common it is to say of a case, 'there is a cavity in the lung,' and to condemn it on the false idea that all such cases are short-lived; and with what surprise we have seen even eminent pathologists regard a rally of the general health under such circumstances. There are many such cases, and the practical physician is bound to remember them. The extent or stage of local mischief is no measure *per se* of the danger of the patient, and until the cases hitherto regarded as merely exceptional be included in the ordinary history of the disease, and studied as part of its customary phenomena, we may have diagnostic accuracy, but our powers of forming a correct prognosis will be small. In this section we have therefore not been dealing with abstract pathological questions, but with facts of most practical bearing and essential to the establishment of a more certain mode of prognosis.



No. 1.

DIAGRAM REPRESENTING THE RELATIVE DURATION OF THE VARIETIES OF PHTHISIS AND ITS COMBINATIONS WITH OTHER AFFECTIONS.

Rapid Phthisis.
Ordinary Phthisis.
Rapid Waste.
Larynx affected.
Pregnancy lactation Phthisis.
Marked predisposition.
Phthisis with suspended Catamenia.
Gastric Symptoms.
Origin in acute disorders.
Phthisis with morbus cordis rheumatism gout.
Strumous tubercle.
Syphilis.
Physical Signs at base of the Lung.
Wavy inspiratory Sound.
Fistula with Phthisis.
Profuse Hæmoptysis.
Oil great improvement from use of.
Cretaceous expectoration.
Age over 45.
Chronic diffused tubercle.
Tolerated Cavity.
Digital Clubbing.
Bronchitis emphysema. Phthisis.
Chronic first Stage.
Chronic third Stage.
Chronic second Stage.



№ 2.

CURVE FORMED BY THE LINES REPRESENTING THE RELATIVE AVERAGE DURATION OF THE VARIETIES OF PHTHISIS AND ITS COMBINATIONS, TAKEN IN ORDER ACCORDING TO THEIR VALUE.

CHAPTER V.

DURATION OF PHTHISIS.

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Prognosis founded on duration.

THE basis of all prognostic calculations regarding cases of consumption, must be founded on a knowledge of the actual average duration of the disease. And yet there is no knowledge so difficult to obtain, and there is no class of facts on which so great a variety of opinions has been offered.

The causes of this divergence will be found, on investigation, to be referable to several heads.

The different varieties of the disease itself, and its modifications by the various agents referred to in this work, stand at the head of these. So long as phthisis continues to be viewed as a single affection of invariable progress and termination, will contradictory opinions be offered as to its average duration. It is only by studying its natural divisions and assigning to each its separate and appropriate place, that we can hope to arrive at an accurate estimate of its length. Were a calculation of the duration of fevers to be made from records including the exanthemata as well as typhoid, the intermittents and remittents, it is obvious that no records of accuracy or value for practical purposes could be deduced from such a method. We should reject such a classification, as unscientific and useless. Tuberculosis possesses, in the single fact of a certain amount of uniformity of the morbid material, a basis which includes all its subdivisions, but such wide deviations occur in its progress and results, that no average which should be

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of the slightest use in practice could be derived from the most careful records of all the instances of the disease which ever occurred under observation, were they viewed as a single affection. It is plain, that from so loose an opinion as Portal's, 'that the disease lasts from eleven days to forty years,' we can gather no knowledge available for our daily work of estimating the danger of individual cases. The mental habit, too prevalent in the profession, of regarding phthisis as a uniform, destructive, and irremediable disease, stands therefore in the way of obtaining the very kind of information likely to advance our knowledge of it, and of estimating the true duration of its several varieties.

Difficulties in ascertaining duration of phthisis.

Further difficulties will be found in the manner of obtaining information from the patients themselves, in the obscurity of the earliest symptoms of the disease, in the position of the different observers as regards locality, in the form of the affection commonly prevalent under their notice, as well as in the necessary limit to the experience of most medical men.

The patient.

First, the answer of the patient to the question, '*How long ill?*' will almost invariably be given, even by the most truthful, with reference to the existence of a group of symptoms which he fancies to be the most important. Thus, if cough have existed for six months with severity, or if the individual have been prevented from working for the same period by increasing weakness, the answer will be 'six months,' although a year or two previously he may have had hæmoptysis, attacks of sweating, or some grave alteration of health indicating the beginning of the tubercular affection. A very careful cross-examination of the patient is absolutely necessary if the actual commencement of his disease is to be searched for. In hospital cases, especially if the first answer given be noted down, we are almost certain to record an error. Again, there are very few patients able to give in a single reply a correct description of

the earliest symptoms and first beginnings of a chronic disease. A skilled questioner can alone obtain accurate information of the kind desired, and even among professional men we have occasionally to witness the acceptance of statements, as to the commencement of the disease, which are manifestly incorrect.

Latency a difficulty.

Another source of error arises out of the very nature of the case. A disease which has remained latent for years, is suddenly lighted into activity, and the patient will most certainly refer to the last access of illness, that being the one to which his attention is exclusively directed. But it need scarcely be said that in this variety of phthisis the actual commencement of the affection must date from the first symptoms of the earliest attack, and not from the later evidence of the revival of the disease.

Remissions.

The peculiarity dwelt on in this work, which is shared by almost all chronic affections, and is a very common character of tuberculosis—namely, the occurrence of remissions in the advance of disease, in which the patient remains without fever and without any active symptoms to denote its presence, constitutes another source of error, for he will generally date his illness from the breaking up or termination of one of these pauses, and the renewal of irritative local and constitutional disorder.

Early symptoms obscure.

The obscurity of the earliest symptoms of phthisis, forms a source of error exceedingly common. Surrounded with difficulties, even to the most careful and informed student of disease, the greatest tact may be found at fault, and the most cultivated analytical judgment be betrayed into mistakes. It has been the object of the author, and of every one who has thoughtfully written on this subject, to try to render this subject less obscure; and it should never be forgotten that a comparison of physical evidence with the history of the case and the general symptoms, can alone approach to accuracy.

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In estimating the starting-point of tubercular disease, we have often to look for, and refer the patient back to early symptoms long forgotten—to an hæmoptysis in youth, or to an attack of hectic which had taken place years before. A discriminating judgment as well as a practical knowledge of the disease of which we are treating, are required to elucidate the often scanty history with which our patient supplies us.

Disease differs in various localities.

The position of the different reporters who have recorded their observations on phthisis has added a source of error to the received belief regarding its character. When Louis tells us that more than half his cases terminated in less than nine months, we see at once that he must have had much more than the average of acute cases under his care; and in carefully studying Laennec it will be seen that he describes a more rapid form of the disease than is generally prevalent in England. His practice is well-known to have been chiefly in the conventual establishments, where seclusion, mental depression, and other like causes tended to induce a more continuous and lower form of the disease than is found among those in this country who reside in their own homes. It is possible also (and is the author's belief) that a more acute type of phthisis prevails generally in France. In Italy this is positively ascertained to be so. Cases of consumption among the natives in Rome are most commonly acute, and the physicians there assign a few months as their average duration. Excellent authorities have also assured us that in the West Indies and in the Indian peninsula consumption is almost always a rapid disease. Native physicians of Spain, Portugal, and Peru have also borne evidence to the same fact. They wonder at the extreme frequency of the occurrence of the disease in England, but they are equally astonished at the numerous chronic and prolonged cases which they witness here.

Country and climate.

In considering the various fallacies to which all

statistics are liable, the above considerations must have weight; but there is still another which has much influence on opinion, although it may scarcely vitiate large returns. The experience of medical men in private practice is drawn from so small a number of cases, that it often represents the accidents and exceptions rather than the actual prevalent features of a disease so frequent of occurrence as phthisis. It cannot even be said that the in-patients in the Hospital for Consumption, as reported, represent a perfect average of the real duration of phthisis. They are a selected class, and the experience of the physician is that in very many instances, and from motives of charity, patients suffering from a rapid and continuous form of the disease are sent into the wards, enormously raising the mortality, and representing, even when taken with the others, an average of much shorter cases than is witnessed in private practice or in the out-patient department. In the latter are seen individuals of all classes, excepting the highest, and of all ages and occupations. The necessities of home cares and of continuing the daily work are but little interfered with by a visit once a fortnight to their physician, but these urgent claims of domestic life shut out large numbers from the possibility of availing themselves of in-door treatment in a hospital. The large class afflicted with chronic slow phthisis are therefore found chiefly among the out-patients. It is matter of observation that men will follow out the most pernicious trades while far advanced in consumption, to provide for the necessities of their families, and so it is found that in our wards we have rarely incipient phthisis in males. For a like reason the early form of the affection is most commonly represented in the hospital by females. Again, mothers of families must and do stay at home at their post till nature almost sinks exhausted, and rarely become inmates of our wards for the most natural

Experience of small numbers.

Hospital in-patients, causes affecting.

Out-patients most valuable.

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and the best of reasons. The phthisical in-patients of the hospital are in point of fact composed almost entirely of two classes: men so ill as to be unable to work, and young females who may be in the early or more advanced stages of the disease. For these reasons there are certain inevitable fallacies in the in-patient statistics, which represent certain classes, and the sexes in different proportions* as regards the stage of disease, and a larger number of cases of continuous phthisis than the true average.

Whatever may be said of the use or abuses of special hospitals, it cannot be denied that at Brompton have been brought together for the first time numbers, beside which the few hundred recorded by Louis, Bayle, Laennec, and others, appear very small indeed.†

Opinions on duration.

The opinions of skilled observers on the absolute duration of phthisis, all forms of the disease being taken together, must now be considered. Portal considered phthisis might last '*from eleven days to forty years*;'‡ and he is certainly nearer the mark than any other authority.

Laennec	24	months.
Louis and Bayle (314 cases examined) mean duration	23	„
Andral, cases in La Charité	24	„
Sir James Clark, taking cases in the upper classes of this country with all advantages for the care of health	36	„
Dr. Williams considers that the average is prolonged by the use of cod oil to . . .	48	„

Such are the opinions of the authorities who have most considered this subject; and it will be remarked

* The number of beds for men and women is equal, viz. 105 for each sex.

† The first Medical Report (1849) gave an analysis of 4358 cases; the second (1863), of 5658 cases of phthisis. Dr. Theophilus Thomson gives the experience of 2000; Dr. Cotton of 1000; and a minute analysis of 3500 is offered by the author in this work.

‡ Vol. iii. p. 251.

how the English observers have raised the average *from two years to three or even four.*

In all of these calculations the disease has been considered as a whole, all forms and varieties have been thrown together as it were, and inferences have been drawn which, however valuable in a general and statistical point of view, can never teach the practitioner what the probable duration of any given case may be. It is well to know that all figures point to the fact, that consumption on the whole is not so rapidly destructive as has been supposed; but this general fact can be but a small consolation to a suffering patient, or convey much information of value to his attendant. The question becomes an individual one, and its importance rises in proportion as its application becomes narrowed, the information which men seek about themselves or their families possessing for them an interest far beyond that attaching to larger and more general questions.

General reports fallacious.

Although the science of medicine may have been rendered more complete by the large numbers recorded in such tables as those in the Registrar-General's Reports, which tell how many deaths the disease has caused in a given period, they can give no certainty to the practitioner, and no information as to any particular case which he may be called on to treat.

The disease wrongly considered as single.

If, indeed, we could obtain information as to the kind of consumption which prevailed in each case, or in each class of cases, and the average duration of such classes could be ascertained with some degree of accuracy, a foundation of practical knowledge of a most valuable description would be thus supplied. But to such questions as 'How long may we expect a chronic cavity in the lung to last?' or, 'What constitute the elements of chronicity in any given form of the disease?' there has been no reply in either the reports of registrars, the theoretical treatises of Germany, the more practical works of the French school, or in the

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matter-of-fact handbooks of practice which abound in our own country.

Such information is often found stored up in the personal skill of a single practitioner, and must be the result, not only of his labour over a multitude of cases, but of his individual tact, observation, and ability in the recognition and discrimination of the facts and circumstances which bear on his patient. But although we all know such individuals, and refer our doubtful cases to their wisdom, there has as yet been no attempt to help the profession as a whole to the accurate discrimination of the varieties of phthisis, and of the causes which affect the duration of the different forms of the disease to be met with in practice.

The attainment of such evidence as could place this kind of knowledge on a true basis is difficult, and some of the obstacles in the way have been already noticed. These have reference to the method of obtaining information, and are common to all investigations where large numbers of facts obtained by different observers have to be collated.

A natural classification attempted.

A higher and more difficult task has been attempted in this work, namely, such a natural classification of the disease as may lead to an easy recognition of its different forms, and such a description of the symptoms and history of the varieties found in actual practice, as may furnish data of the more certain kind for estimating and calculating the duration of individual cases.

Phthisis presents varieties.

If consumption observed a uniform course, and were, so to speak, a single affection, the general history so accurately given of it by many authors would be sufficient both for its recognition and a fair estimate of its gravity and probable duration. But if we find in actual practice that the affection has many varieties, that a patient with double cavities may be found after

Vital differences.

fifteen or twenty years, not only surviving such local injury, but in the enjoyment of tolerable health, while another sinks exhausted during the formation of a single excavation in the lung, we must conclude that important vital differences exist between the two cases. Again, if a deposit in the lung be the source of violent irritation, hectic, and wasting in one individual, and that the same condition may in another remain tolerated for years without exciting grave disorder, we can scarcely regard the cases as identical, and may even be inclined to question the identity of the cause. Or if a tubercular deposit in one person runs through the well-known changes of softening, involving all the structures surrounding it, spreading rapidly, increasing the area of local disease by new deposits, prone to assume the same destructive activity; while in another a deposit, also known to be tubercular, is slow to undergo destructive changes, involves the tissues but slightly, and remains almost inert as a foreign body; or still further, if the same deposit instead of softening begins to lose its animal portions, and in course of time to be found only as an inorganic compound, we are almost compelled to doubt the identity of the two deposits in composition, and to adopt the belief that of tubercle itself there exist at least two varieties.

Different kinds of tubercle.

Or if by careful observers it can be established that a single massed deposit blocking up one apex, or a few scattered tubercles widely and sparsely diffused through the lung, have each in their way a tendency to long duration as regards the case, the one running rapidly into cavity, but there stopping in its destructive course, the other remaining in a state of slow softening for years, we are compelled to assent to the proposition that the localisation of the deposit in the lung may (in addition to the other influences) affect the duration of a case of phthisis. And if in our study of this constitutional malady we see strong reason to believe that hereditary

Differences of localisation.

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Hereditary tendencies to peculiar forms of disease.

predisposition has much to say, not only to the production of the disease (a fact long known, and so elucidated by statistics as almost to forbid any further accumulation of evidence), but actually modifies the form of the disease, and that in some families a rapid, in others a slow and latent affection prevails, our acceptance of the value of the influence in impressing a stamp on any given case will be an immediate result.

Age.

And so of age, which is a great modifier of tuberculosis in its largest sense. If there be two distinct ages in which the disease is found slow and prolonged, another period of life at which continuity and rapidity form its character, and if this inseparable condition of every case be found to influence duration, we shall see reason to assign this important element of prognosis a suitable value.

Symptoms.

Even symptoms rise into value and assist our classification of the varieties of consumption, when as hæmoptysis they are found to influence its duration.

Terms insufficient. Retrogressive and advancing phthisis.

It is plain that a mere division of phthisis into the retrogressive and advancing varieties will not express the several subdivisions of the disease which are found in practice. Phthisis, as is elsewhere pointed out, is not always either advancing or receding. In every form of it, excepting the acute, there are pauses more or less long, in which the deposit may be quiescent, and the patient at an average of health, from which there are, for the time, few variations.

'Slow' and 'quick.'

'Slow' and 'quick,' 'latent,' and other expressions made use of by authors, will not fulfil the conditions essential to a natural classification of the disease. A patient may be in 'slow' phthisis with a deposit unsoftened in the lung, or in 'slow' phthisis with a cavity formed, or in 'rapid' phthisis without any softening ever taking place from the invasion of the disease to the period of death, or with most extensive breaking-up

Latent.

of all the lung tissues leading to the same result. The word 'latent' is misapplied to tuberculosis. Should there be a deposit in the lung recognisable by its physical signs, but causing no symptoms which impair the patient's health, the disease being recognised, or capable of being diagnosed, is not latent but quiescent. The patient is in one of the pauses before alluded to, and this so-called 'latency' may be observed in any of the three stages of phthisis.

Divisions into 'stages' insufficient.

Consideration derived merely from the 'stage' of disease in which the patient is found, cannot assist us much in offering a prognosis on the duration of the affection. This division made by auscultators for their convenience is not a natural classification, and, like all artificial divisions, will not stand the test of practice. A patient may die in any of the three 'stages,' or may be in tolerable health in the last. The profession has long been misled by this voluntary blind which science has thrown over nature, but which its originators never designed should propagate false conclusions. The influence of the stage of the disease on duration is undoubtedly great, but to form even an approximative estimate of its value in this sense, it must be carefully corrected by a consideration of all the other influences which have been mentioned, and can never stand singly to represent the condition or prospects of the patient.

Recovery possible.

In reviewing the numerous writings on phthisis by which medical literature has been enriched, the possibility of recovery from the disease when once established, or even of a substantial amendment, both in physical signs and general health of the patient, have been so lightly touched on, as to lead the student to the inevitable conclusion that such events must not be included in the ordinary history of the affection. A timidity on this point is very observable, and till Bennett and Walshe published their works, and Quain

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his cases, the records of attested instances of recovery were few. When the author joined the staff of the Consumption Hospital he shared the common view that consumption invariably meant death. But gradually, and by careful study, the fact that there are many credible recoveries from tubercle in the lung forced itself upon him, and this conviction has been strengthened by his larger experience. Till this fact is boldly stated and openly accepted, we cannot be said to be fully acquainted with the natural history of the constitutional malady of which tubercle is but a form and an expression. In this conviction Louis wrote that 'no one dies of a first attack of tubercle;' and our estimate of the danger, or, in other words, of the duration of any particular case, must always take into consideration the fact that tubercle may be and has been absorbed, and that cavities in the lung have closed, and the patient been restored to health.

Proximate causes influence duration.

The proximate as well as the remote causes of tubercle have been found to exercise a modifying influence on the course and duration of the lung disease; as when consumption originates in acute disorders, as pleurisy, rheumatism, or the rheumatic constitution, and from affections of the zymotic class. Whether the blood disorder of the originating disease has been transferred or transmitted to the secondary affection or not, it is evident to observers that the tubercle after measles in early youth, and that occurring by gradual development, without apparent causation, after middle life, are affections as different in their progress and development and duration as any two chronic organic diseases. The rheumatic constitution may, and perhaps does, possess features in common with tubercle; but apart from the theoretical interest attached to their comparison, the modifying influence of the one on the other is unmistakable. The same may be said of the nearly-allied affection, gout. The coexistence of either with

phthisis will be found in certain instances to suspend, in all to interfere with, the ordinary course of the concomitant disease.

Struma.

A large field of study is opened in the consideration of the identity of the strumous constitution with tubercle. To most pathologists the question seems decided, but the practical points of the alternation of external struma with tubercle in the lung, and of the peculiarities of consumption in conjunction with glandular enlargement and suppuration, have not perhaps received the attention which such a subject deserves. Still further, the features of lung disease in persons of the marked strumous habit will be found to be modified both as to their location, their intensity, and their duration. Strumous phthisis therefore forms a natural and large division of the disease.

Emphysema, mor bus cordis asthma.

Certain influences antagonistic to phthisis are found on investigation to retard its progress and mark its symptoms. Such are emphysema of the lung, spasmodic asthma, and obstructive diseases of the heart, hypertrophy of its walls, and in certain instances dilatation. The combination of any of these with tubercle has an undoubted and retarding influence on the progress of the latter, and this class of cases deserves a careful consideration, and stands apart from most other affections which are found associated with phthisis. The combination being by no means rare, it would naturally take a place amongst those varieties of the tubercular affection in which the ordinary duration and progress of the latter become modified.

Pregnancy, lactation.

The origin of phthisis in pregnancy, after delivery, or in the course of lactation, has been found to exercise a peculiar influence on the disease, and to generate a form of tuberculosis fraught with peculiar danger, and attended often from the beginning with symptoms of urgency and rapidity. The influence of the changes undergone by the system at this period have scarcely

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received the consideration which so important a subject deserves. The puerperal period exhibits a proneness to blood contamination very remarkable. Diseases of contagious origin, as scarlatina, if then contracted, assume an unusual malignity, and the more chronic affection of tubercle is accelerated in all its stages if already present, and precipitated into actual existence if only threatened or impending. This class of phthisical cases arranges itself separately in any natural history of consumption, and the probable duration to be assigned to these cases will be found unfortunately low in our scale of estimated probabilities.

Certain complications.

Leaving these large classes, and approaching the aspect of the disease in its details, it will be found that an infinite modification of our cases arises in practice from the presence or absence of certain symptoms denoting the disturbance of organs other than the lungs, or of some of the great vital functions.

Gastric disorder.

Thus the marked disorder of the gastric intestinal canal is found as an element of danger surpassing even that of extended lung disease, and must enter as a prognostic into our consideration of every case which presents. An irritable mucous membrane, the early occurrence of vomiting, diarrhœa of the simply irritative or of the ulcerative form, are symptoms so grave as to excite just alarm even when the lung disease is in a limited form and respiratory symptoms are moderate. A moment's consideration of the converse condition—an unimpaired digestive system—will show the value of the integrity of this extensive vital tract of membrane. Our most prolonged cases of phthisis are those in which, in spite of local mischief even to the third stage in the lung, the assimilating and digestive powers continue comparatively undisturbed.

Fever.

The degree of febrile symptoms is generally a pretty exact measure of the irritation of the lung, and disintegration of the pulmonary tissue advances *pari*

passu with the intensity of the hectic access. We do not need our stethoscope here, for the pulse and sweating give us, as it were, an insight into the chest. But the pulse in chronic, as it more strikingly shows itself in acute disease, is also undoubtedly the 'dial or gnomon' of the nervous system.

Nervous system.

On the integrity of this great regulator of vital power and duration depends the chronicity of many a case of phthisis. We have all witnessed life prolonged when lungs had almost ceased to breathe, under the sustaining influence of nervous power excited to gratify a feeling or gain a purpose.

Method adopted by the author.

Acting on these views, which are strengthened as the field of observation enlarges, an attempt has been made to form a natural classification of phthisis derived from an analysis alike of physical signs and of symptoms, of the whole history and antecedents of the patient, including the age and sex, the personal temperament, the exciting causes, and the intercurrent affections, and to assign a relative duration to each; and although this method presents difficulties inherent to every description implying so many considerations, it is hoped that the attempt may be more than an approximation to truth, and may prove of valuable assistance in forming a natural prognosis in individual cases of the disease.

The method adopted has been to note with care every single case in the presence of the patient, and this has been done personally by the author to the amount of upwards of twelve thousand. The state on leaving off treatment has been recorded, and the earliest symptoms have been sought for with scrupulous care. The physical condition has been invariably recorded at the time, and the complications and prominent symptoms noted as they arose. Out of this large number of cases occurring among the out-patients of the Hospital during a period of seven years, all the

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instances of tubercular disease of the lung of undoubted character have been selected, and such only as presented the physical signs of consumption retained. All spurious or doubtful cases have been rejected, and every affection but phthisis sifted out. About three thousand five hundred thus selected for analysis were thrown into groups, according to their peculiar features, every case-paper being separately studied, margined, and classified, and the duration at the period of leaving off attendance at the Hospital recorded.

It became evident in this slow and laborious task that the disease in its largest numbers classified itself, and the varieties described are therefore not artificially or theoretically arranged, but are only the reflection of facts. When characters so prominent as to disclose many points of similarity were evident, the cases naturally grouped themselves, and it only became necessary to state the leading features at the head of each class, in order to perceive how frequently resemblance occurred. The larger characters are of course alluded to, and so far and no farther is a classification advisable or even possible. It is understood that no two cases of phthisis, nor indeed of any other disease, are precisely alike, but certain broad features are stamped on every instance of disorder sufficient to show that they are akin to others with similar manifestations. And this proves true, not only of the history of the affection, but very markedly of its character.

Figures given approximative.

As respects the absolute duration of the disease, either taken as a whole, or in its several varieties, the figures given are approximative, but do not represent the real length of the cases, excepting in the instances where death occurred, which are few in number compared with the total. When, therefore, the duration of a class is stated, it is to be understood that the figures given represent merely *the length of time for which the case had lasted, from the earliest symptom up to the latest*

period while under observation, the actual duration being, of course, very much longer than this. In all cases where the replies given were unsatisfactory or vague, either from evident inaccuracy on the part of the patient or his friends, or from want of memory of the events occurring at the commencement of the disease, the period is marked *indefinite*, and in calculating the averages from these figures the *indefinites* are in certain instances spread over the whole of the cases, but it is stated where this has been done.

By these means and the help of a skilled mathematician,* well practised in calculations as applied to life insurance, we are able to present the Tables appended.

In arranging the classes it was necessary to assume a certain standard, to be called 'ordinary phthisis,' in which, of course, a large number of our cases is to be found, and it was decided that this name should have reference to duration, and include all cases which presented the ordinary features of phthisis and had lasted eighteen months. They would thus stand between the acute or rapid form of the disease, and the more chronic or prolonged. The other classes were formed as stated after a natural arrangement from possessing characters common to all in the same group.

Natural groups.

The next great groups to ordinary phthisis are, 'chronic first stage,' 'chronic second stage,' 'chronic third stage,' and subdivisions of these will be found as 'diffused tubercle' and 'tolerated cavity,' which possessed sufficient interest to render their separate study advisable. The large class of 'strumous phthisis,' includes all who manifested the scrofulous diathesis in a marked degree. The other divisions explain themselves. The localisation of tubercle, the occurrence of profuse hæmoptysis, the complications with asthma

* My best acknowledgments are due to J. R. Campbell, Esq., M.A., of the 'Queen Insurance Company,' for the manner in which he has executed this task.

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and disease of the heart, the influence of the rheumatic diathesis, and the origin in acute diseases, with the influence of pregnancy and lactation, appeared to deserve separate consideration in detail and a distinct column in the Table. Some other classes there are rather scantily illustrated, and therefore of less value, but it was thought better to include them in our consideration of the disease. Amongst them will be found the curious symptom of digital clubbing, about which some interesting details will be found elsewhere. As a sign of chronicity in phthisis it possesses undoubted value.

Viewing the disease as a whole, in which are included all its varieties, it must be evident that the opinions of the older authorities quoted on the character to be assigned to it, were incorrect. Consumption lasts much longer than has been stated by pathologists, or than is believed by the public. Many cases at which we are inclined to smile, which were given up by doctors, but outlived the prediction to arrive at old age, were undoubted recoveries from phthisis. Many more were instances of an early invasion of the disease with subsidence of the symptoms, and long tolerance of the deposit. When these cases are considered, added to the known instances occurring in the practice of all of us of tubercle in every stage, including cavity, being resisted and tolerated by persons otherwise healthy for eight, ten, and even twenty years,—we are compelled to acknowledge the undoubted tendency to extreme chronicity which this affection often manifests. It will be remarked how such cautious and skilled observers as Clark and Williams have extended the nominal period of duration to four years, the latter authority attributing the supposed extension of the term of the disease to the use of cod-liver oil. We go a step further, and maintain that owing to a greater accuracy of diagnosis the revelation of a

lengthened duration of consumption formerly suspected but now certified has taken place, and that of this fact we can be as secure as of any other observation on the natural history of disease. We believe also that the term of the disease has been extended not only by the use of oil but by the sensible, non-specific, and supporting treatment which modern practitioners follow, and by the omission of the lowering, antiphlogistic and depletory measures formerly so common. Especially, blood-letting has been given up, and the pleuritic pains of phthisis, and its frequently-recurring hæmoptysis, are no longer bled for. In the face of such facts as we are able to record, we cannot wholly agree with Sir J. Clark that the greater means of the wealthy, and the possibility of obtaining all comforts and luxuries, have been the chief means of adding to the length of life of the phthisical. Some of our most prolonged cases have been among the out-patients of a London hospital; among mechanics, following unhealthy trades, and with but scanty supply of wholesome food, eaten in ill-ventilated and dusty chambers, without possibility of obtaining change of air, or even enough of fresh air! It is doubtless true, that these deprivations are pernicious agents, and that they shorten life in the phthisical and the non-phthisical; but we urge that if, in spite of such obstacles to resistance or recovery, consumption is so frequently seen in a prolonged form, the period of its duration as a whole, could it correctly be ascertained in all classes, poor and rich, must be far higher than even the highest estimate which has been offered by the boldest or most hopeful investigation. It will be seen from the Table that the average *duration while under observation*, of all the cases taken together, was *two years, six months, and three-fifths nearly*; but this represents only a part of the period of the affection; and in it are included cases of the most acute and rapid

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form, as well as those which had become chronic. How much longer did these patients live? (deducting the 129 who died while under treatment) is our question. But who shall reply to it? Figures can do no more, and the results of many years' study of such cases, with unusual opportunities, is so far unsatisfactory that we can only prove that, out of 3,566 cases only 129 had died at the end of two years and something over six months. Yet still, out of these recorded observations, the fact is evident that, even while the average duration, during the time they were under observation, is so high, a much longer term must be assigned to the greater number of those who were surviving when the last note was recorded. On this point it is interesting to note the 'state on leaving hospital;' and most careful calculations have been made to elucidate it. On the whole, the condition of these patients has been favourable to the expectation of life for a considerable term; and although it would be impossible to calculate such expectation with accuracy, or from figures to derive a conclusion capable of being applied to individual cases of phthisis, yet it is easy to see that the whole average duration of the disease must be raised beyond even the period assigned to it by the observers referred to.

But the calculations given, referring to the duration of phthisis, taken in all its forms, have little practical value. It is when we come to study the relative duration of the different varieties of the tubercular disease, that something applicable to the exigencies of our daily practice arises. No one could with reason assign a duration to any given case from a perfect knowledge of the most perfect statistics on phthisis, taken as a whole, ever put together; but with the assured information that certain varieties of disease tend to great prolongation—say a single cavity in the right lung—in a male aged forty and without hereditary taint; and

with this knowledge, strengthened by the history of numbers of instances of a similar kind, we may safely offer a prognosis, based on rational facts, that such a case may last not only four, but twice four years. Judging from the older views on the subject, such a patient would be in the last stage of consumption; but while assigning it a place in the third stage, we may prognosticate for it a duration far beyond that of many individuals who are in the stage of softening.

The elements of chronicity mean only the conditions under which a given amount of established disease in the lung may be tolerated; and in the description of the several classes, an endeavour has been made to assign to each the features by which they are recognisable, and to establish on rational grounds an estimate of their possible duration. Of course any empirical assertion in prognosis is to be avoided; and it is not pretended that these calculations can enable us to state with certainty the duration of a single case; yet the knowledge that such a course of the disease in an individual is not only possible but probable, because certain conditions prevail, is a reasonable application of science to practice, and will be found to secure credit to the physician, and, by calming the fears of the patient in chronic cases, to add the important element of hope to his other favourable conditions. And the same may be asserted of the rapid form of phthisis, where a prognosis truthfully delivered may save many cruel but well-intentioned efforts on the part of friends, and permit of the patient continuing to be surrounded by home comforts instead of being removed to a foreign country.

With a view to throw additional light on the conditions which favour chronicity, a Table has been constructed, which shows in a tabular form some of the leading facts regarding 1,200 cases, which have been divided into classes of 300 each, according to their

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duration for 'six months,' 'one year,' 'one to two years,' and *'four years and over.'* These cases were not selected, but taken just as they occurred in going over the hospital note-papers. The influence of age, sex, predisposition, stage of the disease, the being confined to one or extending to both lungs, and of the existence of hectic, hæmoptysis, of laryngeal, and of gastric disorder, are seen in numbers, and convey a certain amount of information, which is given more in detail in the chapters on each subdivision.

GENERAL ANALYSIS OF CASES OF DIFFERING DURATION.

(1200 *in all.* 300 *cases of each class examined.*)

	Six months' duration	One year's duration	One to two years' duration	Over four years' duration	Totals
Males	202	172	185	170	729
Females	98	128	115	130	471
Age under 20	76	76	52	44	248
„ between 20 and 30	126	117	121	115	479
„ „ 30 and 40	68	73	89	87	317
„ over 40	30	34	38	54	156
1st stage of disease (deposit)	116	122	73	84	395
2nd „ „ (softening)	98	95	98	99	390
3rd „ „ (cavity)	86	83	129	117	415
Both lungs affected	138	131	159	161	589
One lung affected	162	169	141	139	611
Hæmoptysis had occurred in	140	170	185	206	701
No hæmoptysis	160	130	115	94	499
Hereditary predisposition in	96	95	87	84	362
Diarrhœa had occurred in	50	59	76	54	239
No diarrhœa	250	241	224	246	961
Larynx affected in	27	32	26	19	104
„ not affected in	273	268	274	281	1096
Hectic sweatings now present in	156	184	157	140	637
„ „ formerly „	50	39	49	60	198
Not remembered to have existed	94	77	94	100	365
When first examined found to be losing flesh and strength	262	267	238	256	1023
„ stationary or gaining	38	33	62	44	177
Vomiting a symptom in	37	28	47	36	148
Were emaciated to the 1st degree	158	142	126	135	561
„ „ 2nd „	127	156	153	127	563
„ „ 3rd „	15	2	21	38	76

The leading features of the above Table may be stated in a condensed form.

SEX.—In all the periods of duration, 60·75 per cent. were males, and 39·25 per cent. females. It is elsewhere stated that phthisis tends more to extreme prolongation in males than in females; but in this Table the disproportion does not much increase in the cases of longest duration; instances of extreme chronicity not being included in it.

AGE.—The age of the greatest prevalence of consumption in all its forms is from 20 to 30; next to which is the decade between 30 and 40; then the period under 20; and the least of all is that over 40.

RELATIVELY TO DURATION.—The largest number of cases *under* 20 were found in the periods of duration of *six months* and *one year*, while the smallest number at this age appears in the *four years* column. This age is little favourable to chronicity; 17·74 per cent. only of the whole reached four years of duration. The more rapid and acute forms of phthisis prevail at this early period of life. Under 20.

Between 20 *and* 30 *years of age*, which may be called the great period when consumption is most common and most destructive, the numbers in the different periods of duration are nearly equal. 20 to 30.

Between 30 *and* 40 the numbers in the short periods decline, while those in the longer increase; age showing a very decided influence in lengthening the duration of the disease. 30 to 40.

Over 40, 13 per cent. of all the cases occurred; 4·5 per cent. of them reached a duration over four years. Over 40.

STAGE.—In the 1,200 examined, the largest number were found to be in the third stage (415, or more than one-third.) Stage.

The first stage of the disease was found to exist in the greatest numbers in those who had attained one year of duration; next, in those of six months' duration. After four years, out of the 1,200, 7 per cent. remained still with evidence of unsoftened deposit in the lungs. First.

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Second.

The numbers in the *second stage* were equally diffused over the four mentioned periods of duration; and after four years of illness, there were as many found so circumstanced as there were at six months. This shows the frequent occurrence of exceeding slowness in this stage.

Third.

The *third stage* was attained by 7·16 per cent. in six months. The greatest number of cases of this class was found to have been ill between one and two years, and at the end of four years as many as 117 out of 1,200, or 9·75 per cent., were found with the signs of cavity.

The deductions from the view thus exhibited in large numbers of cases, when analysed, as regards the stage of disease, will amply bear out the views advanced regarding the slowness of the progress of the greater number of cases of consumption. It will also show that *stage* 'per se' is not a measure of the danger of the case, nor of the chances of life for the patient.

One or both lungs.

One or both Lungs.—In a nearly progressive ratio, as the duration increased so did disease extend to the second lung. In 138 cases at six months this result was observed; yet, out of the 300 who outlived four years, as many as 139 (46·33 per cent.) were found with a single affection only. In the first instance, doubtless a more acute form of the disease had created very extensive local mischief, yet out of 589 who had both lungs affected, the large proportion of 161, or 27·33 per cent., reached the duration of four years.

Hæmoptysis.

This symptom occurred in 701 out of the 1,200 cases, 58·41 per cent.; but of the 300 who reached the duration of four years, 66·66 per cent. had it; so that it cannot be considered as denoting in all cases a rapid progress of the disease. It was found in progressive frequency as the duration increased.

Diarrhœa.—This symptom had occurred in 19·91 per cent. of all the cases. In those which had attained the duration of four years, 246 out of 300, or 82 per

cent., were found without it. Its absence is very important as an element of chronicity.

LARYNX.—This part of the air-passages was affected in 8·66 per cent. of the whole number of cases; but of those who attained the duration of four years, only 19 (out of 300), 6·33 per cent., had symptoms of laryngeal irritation. The extension of disease to the organ of voice, although a much less frequent complication than diarrhœa, is a bad prognostic indication.

HEREDITARY PREDISPOSITION.—This is taken to imply one or more members of the family of the patient. Hereditary predisposition.

The disease was hereditary in 30·16 per cent. of all the cases, and of those so circumstanced the numbers giving the first two periods of duration, viz. 96 and 95, closely approximate, while a like approximation will be seen to exist between the numbers exhibiting the two latter periods of duration (87 and 84).

EMACIATION.—The degree of emaciation observed in cases of different duration was noted. A slight wasting was marked 1; a more marked loss of flesh, 2; while 3 denoted a very great degree of marasmus. In observing the progress of chronic phthisis, this method proved useful, it being found impossible to weigh any but the more remarkable cases. A large number, as might be expected, were much wasted within the first six months of the attack, but a considerable proportion recovered from this so far as to regain a certain amount of flesh, yet below their former average; and it is remarkable that after four years' duration of illness, only 127 out of the 300 cases (42·33 per cent.) were wasted to the second, and 38 to the third or extreme degree. The inference is, that after the first onset of the disease and its customary reduction of weight, a certain rally is made when the case becomes chronic, although the patient never fully regains flesh. A condition of moderate emaciation seems essential to the long continuance of the tubercular disease. An explanation of this has been offered elsewhere. Emaciation.

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Hectic.

HECTIC.—This symptom, marked by the febrile access and sweatings, was found to exist in 53·09 per cent. of the cases examined when they first presented at the hospital, the patients naturally applying for advice during some increase of their symptoms. 16·50 per cent. had previously suffered in this way, while 30·41 per cent. could furnish no account of any distinct attack of hectic. It can scarcely be supposed that the disease had existed in a latent or quiescent form in all of these, and a certain deduction must be made for inaccuracies of memory or description; yet even with this reserve, it is evident that a large number had phthisis in its slow form without any febrile access of marked severity.*

Vomiting.

VOMITING.—This urgent symptom was present in severity in 12·33 per cent. of all the cases. In those who had already attained one year's duration it was found in the smallest proportion, and most marked in those between one and two years ill; while 12 per cent. had it among those who survived over four years.

Relative susceptibility to improvement by treatment.

The *actual state* of the patient was carefully noted in all cases when he presented, and also on leaving, to show the result of treatment. When first examined, 85·25 per cent. were losing flesh and strength, and the greatest susceptibility to improvement was found in cases which were in the two years' class; and next to them, in the four year cases.

* Louis states that one-fifteenth of his cases were 'latent,' that is, had no cough; but naïvely adds, that fever was common in the latent period, a fact inconsistent with the English idea of 'latency.'

Table showing the Actual Duration, up to the latest observation, of 3,566 *cases of Phthisis, with the Average Duration of each class (indefinites not considered).*

Varieties of Phthisis	Months										Years																Duration indefinite	Totals	Average Duration in months
	3	6	12	18	24	30	36	42	48	54	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Ordinary Phthisis	30	82	212	293	26	37	8	2																			98	690	15·22
Chronic 1st stage				8	18	39	18	31	15	16	16	10	4	9	3	1		4			1					1	72	194	49·48
„ 2nd „				1	14	22	15	25	17	21	14	13	19	11	4	8	3	6			6					4	179	203	67·35
„ 3rd „					3	7	20	21	13	19	9	17	13	5	1	6	1	4			3					3	55	145	66·66
Wavy Inspiration		33	41		45		24		12		9	2	1	2	4												69	173	26·60
Chronic, Diffused Tubercle		6	14	16	10	13	4	12	6	7		5	2	1	5	1		1									46	103	37·51
Tubercle at base of Lung		6	15	7	5	9	2		2		1	2				2											11	51	26·35
Strumous Tubercle		30	51	24	3	11	8	3	7	2	7	2	4		1			1									133	154	23·61
Age over 45		13	21	23	11	13	11	4	4	8	1	10		2	1	1		2			1						24	126	33·76
Rapid waste		5	11	6	3	2			1	1																		29	17·37
Digital Clubbing			2		6		11		4		3	2	1		1			1									13	31	45·67
M. Cordis: Rheumat.: Phthisis		25	20	22	10	4	4	7	2	2		4				1		1									39	103	23·30
Tolerated cavity			9	11	9	7	5	4	2		7	2	1	1	3					1							6	62	38·90
Retracted cavity			1	1			7																				4	9	31·33
Ctma. Suspended		8	23	20	11	8		1			3	1		2													17	76	21·71
Pregnancy—Lactation		25	67	40	31	10	4	7	2		2	4	1														39	193	19·39
Origin in acute disorders		13	21		19	3	2		6		3	1	1														5	69	22·78
Rapid Phthisis			177																									177	12·
Bronchitis: emphy. pht.		6	5	2	3	5	5		7		4	6	3	1		6											28	53	49·24
Fistula: pht.		1	3	3	4		3		4		1																8	19	29·05
Syphilis: pht.		2	5	3	3		2		2		1																6	18	23·66
Gastric symptoms: pht.		5	13	6	4		6		3					1													1	38	22·26
Larynx: pht.		6	13	8	7	7	1		2																		2	44	19·22
Cretaceous expectoration		1	1		2		1				1	1															3	7	33·42
Profuse Hæmopt.			95		102	20	77		33		19	5	3			1					1					1	18	357	30·35
Marked predisposition		4	13	8	1		6		2																		3	34	19·41
Injurious occupations		6	7	13	5		15		3		1			3		1											9	54	30·11
Oil very beneficial			6		41		22		16		3	3															9	91	33·09
Marked cases, all stages A		10	15	17	12		12		16		12	8	5	1	4	1	1									1	12	115	41·47
* „ „ „ B		12	24	18	7	9	8		5		2	5			3			1			1						25	95	29·24
„ 1st stage C	15	16	19	2								1															7	53	9·03
Totals	45	315	904	552	415	226	301	117	186	76	119	104	58	39	30	29	5	21		1	13					10	941	3,566	30·59

* It was found necessary to class a number of peculiar cases in this manner. They represent the usual indefinites met with in practice, and the averages of duration would have been incomplete without them.

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The above table reads thus:—Of 'ordinary phthisis' 690 cases occurred, of which 30 lasted, up to the latest observation, for three months, 82 for six months, &c. &c., and 98 for indefinite periods. The average duration of each case of this class is 15·22 months, &c. In calculating the averages the 'indefinite periods' were not considered.

It is composed from the cases under my own observation, and the greatest care was taken to ascertain the exact commencement of the disease. The labour of years is here exhibited in a page.

In the following tables (B. & C.) the age and duration up to the time of death, in 828 hospital cases, is given; but the statements as to the earliest symptoms of the disease are taken from the case papers, no unusual pains having been bestowed on the question. On that point they are, therefore, less reliable than the preceding, as the information supplied is the work of many observers more or less competent.

TABLE A.

Table of Duration of Disease up to the time of death (sex not stated), in 129 *instances noted by the author.*

Duration	6 Months	12 Months	18 Months	24 Months	30 Months	36 Months	42 Months	48 Months	54 Months	60 Months	6 Years	7 Years	8 Years	9 Years	Indefinites	Total
Both sexes	17	12	18	8	9	6	2	4	2	10	9	4	0	2	26	129

AVERAGES.

Average duration (indefinites not included), 2 years 9 months and $\frac{8}{25}$ths, or 2 years 9·32 months.

Average duration (indefinites divided equally among the respective ages), i. e. 2 to each of the 13 epochs. 2 years 11·81 months.

Average duration (indefinites divided proportionately among the cases, according to number), about 2 years 9·28 months.

This table being founded on the most careful enquiries, regarding the commencement of the disease, gives a higher average duration than those which follow.

TABLE B.

Duration of Disease up to time of death in 505 cases.
(*Males.*)

Age Years	Duration: 6 Months	Years: 1	1½	2	2½	3	3½	4	5	6	7	8	9	10	12	15	20	Totals	Averages: Years	Months
Under 10	1																	1		6
„ 15	1		1	1														3	1	4
„ 20	20	25	6	9		2		1	2	1								66	1	4
„ 25	23	23	21	15	3	5	1	1	1	1								94	1	5·49
„ 30	21	33	11	25	6	9	2	1	3	1								112	1	7·71
„ 35	11	30	13	14	3	5		8	3	2		3						92	2	0·58
„ 40	8	19	14	10	2	4		3	1	2								63	1	8·95
„ 45	4	14	9	6	2	2		1	1					1			1	41	2	2·78
„ 50	1	10		6	1	1	2	1	2									24	2	0·50
„ 55	1	3		3				1										8	1	8·25
„ 60																				
„ 65																				
„ 70																				
„ 74				1														1	2	0·
	91	157	75	90	17	28	5	17	13	7		3		1			1	505		

Average duration of all the cases, 1 year 7·66 months.

TABLE C.

Duration of Disease up to time of death in 323 cases.
(*Females.*)

Age Years	6 Months	Years: 1	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	15	20	Totals	Average Duration: Yr.	Months
10		1	1	1														3	1	6
15	4	6	3	2				1										16	1	3
20	15	23	8	9		7		4										66	1	6
25	17	25	8	13	1	10		2			2							78	1	7
30	4	31	8	14		5		7		3	1							73	1	10
35	4	16	7	4	1	2	1	1										36	1	5
40	2	12	1	2		2		2										21	1	6
45		7	2	6	1	2				1	1							20	2	1
50	1		1			1		2				1				1		7	5	0
55		2																2	1	0
60				1														1	2	0
Total	47	123	39	52	3	29	1	19		4	4	1				1		323		

The average of all the averages is 1 year 10 months. It will be remarked in both of these tables how the duration of the disease is increased by age in both sexes.

CHAPTER VI.

THE PREMONITORY STAGE OF ORDINARY PHTHISIS.

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In the observations already made on phthisis as a disease of the system, it has been sought to establish the fact that the constitutional disorder precedes the local. We have now to consider the value of the earliest symptoms. When any physical signs of established deposit in the lung are present, the disorder has ceased to be premonitory, and a certified lung disease is present. Stethoscopic evidence must therefore be excluded.

The facts to be examined imply considerations of the circumstances out of which the disease is supposed to arise, and an analysis of the earliest symptoms. The earliest symptoms are the coincidence of emaciation and the febrile condition, and wasting is in almost all instances the first. Its earliest manifestation is an absorption of the adipose tissue and a thinning of the muscles. Its diagnostic character depends on the absence of sufficient cause. The appetite may be good, the secretions regular, the supply of food abundant. There may be no drain on the system, yet emaciation beyond the lowest average of the individual steadily proceeds. This emaciation is more marked in individuals of middle life, in whom the processes of nutrition have long been impaired; but it is also, as we believe, present in all cases of phthisis, excepting those of the most acute form. It is more marked in those who have been previously stout, and more perilous. It is

Wasting the earliest symptom.

progressive and not recovered from, and is thus distinguishable from the transient alterations in weight, dependent on seasons of the year, variations in diet and exercise, &c., which many undergo harmlessly. The sensation of weakness is also greater than in these latter. The absence of any preceding acute disease should of course be ascertained. Dyspepsia, in its various forms, may reduce the weight, and it will be necessary to distinguish the functional gastric disorder from that which so commonly attends all stages of acute phthisis.

Fever.

Wasting alone is not sufficient to alarm. It is the coincidence of this symptom with the febrile state which indicates organic mischief. Dry heat, chills in the afternoon, and occasional remitting perspirations, with an accelerated pulse, uniformly too high, but increased towards evening, form a group of characteristic symptoms. Gastric disorder, especially in children, and the influence of malaria, if the patient have been exposed to it, are to be carefully remembered in diagnosis, as both of these conditions may produce symptoms identical with those of early consumption.

Blood disorder.

Symptoms clearly referable to blood disorder are occasionally present, and when ascertained have a decided value. I have observed purpura in several cases of impending phthisis. The red streak on the gums, noticed by Thompson,* is rarely found in the premonitory stage, but a paler and narrower streak than that figured may be occasionally present.

The secretions are not of necessity affected, and although a febrile condition may lead to an excess of lithates in the urine, there is no invariable character of that secretion accompanying the stage of phthisis which we are considering.

* *Clin. Lect. on Pulm. Consumption,* with additional Lectures by his son, Dr. E. Symes Thompson. Lect. x. 1863.

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Acid products of digestion.

The disorder of digestion described by Dr. Bennett,* and characterised by acidity in the primæ viæ, has, in my experience, a constant relation to phthisis only in the acute form of that disease, of which it constitutes a distinctive character. Of 50 cases of incipient consumption, observed with peculiar care, with a view to elucidating this point, in 3 only was acidity a marked symptom; in 27 the digestion was more or less impaired (generally slightly), and in 20 it was decidedly good.

If to the foregoing we add a general feeling of *malaise*, of depressed nervous power, and of insufficiency for the requirements of business or the daily occupations of the patient, we shall have a sum of vital phenomena, inconclusive, it is true, as regards the actual seat of the organic mischief, but indicative of blood changes of a serious character.

Some local symptoms may at this time exist, as cough, dyspnœa, pain in the subclavicular regions, and hæmoptysis; but they are rarely present unless the physical signs of deposit in the lung are sufficiently established to be recognisable by a skilled observer. They do not, therefore, enter into our present considerations.

The reverse of the above picture may be seen occasionally, viz. where phthisis is silently developed, giving no warning, and manifesting no symptoms, till the physical conditions of lung-disease are established; but is most rare. Carelessness or recklessness on the part of the patient, or the absence of medical observation, may account for such symptoms being overlooked; but in cases which have been carefully studied, the above may be recognised as the conditions most commonly prevailing.

The following case, carefully watched from the outset, illustrates the foregoing remarks :—

* See Bennett: *Path. and Treatment of Pulmonary Consumption.* Edin. 1859.

Case.

X. Æt. 48. Six feet three in height, well made, wide chest, good muscular development; parents free from chest disease; one sister and one daughter died of phthisis. This gentleman led an active, regular life, took much exercise on foot, often in the country, and spoke in public at least twice a week. For the year preceding Feb. 1855, had complained of unusual fatigue on exertion, and though of very cheerful disposition, he often looked and felt fagged. For two previous years I had remarked in him the gradual formation of arcus senilis, which was now a perfect ring. In the spring of 1855, he suddenly got much weaker, felt unable to take his usual walks, began to lose flesh rapidly, his face looking worn, and the calves of his legs becoming flabby. Appetite became indifferent, but he continued to live well, and took two or three glasses of wine daily. He had no cough, nor expectoration, no pain nor dyspnœa, urine natural, pulse small, averaged 85. Slight chills and sweats now began; chest normal; no physical signs whatever. In June, profuse sweats, debility, purpura on the legs. A careful examination (Dr. H. Roe and myself) showed a general diminution of the healthy *tone* of the percussion note, but this was not localised. In July, went to Schwalbach, and took a course of chalybeate waters, and, contrary to our advice, bathed daily in a mineral bath at 84°. In August, I met him on the Rhine, and was shocked at the change in his appearance. He was wasted to an extreme; his features fallen away, his legs so thin he could scarcely walk. He had that peculiar feeling of weakness and pain across the sacrum which indicates, when chronic, a high degree of vital exhaustion. The sweating was profuse, wetting a mattrass every night, so that he was obliged to use two beds. Pulse always over 100. He had a short, frequent, dry cough, no expectoration, no hæmoptysis, *slight dulness, rough, loud inspiration, expiratory murmur prolonged, and a sensible amount of vocal resonance over the apex of the right lung; signs which were slight, but had not been observed before.* His instant return to England was advised, and the use of gallic acid and cod-liver oil, with an alkaline tonic, and counter-irritation over the right lung. Instead of this, he went to Switzerland, and lived on milk, and in five weeks returned to England. To my surprise, and that of Dr. Roe, he had gained flesh remarkably; the sweating much less, strength vastly improved. *The physical signs were, however, per-*

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sistent (Sept. 1855). In March, 1856, he had no constitutional disorder, had regained weight within a few pounds of his former healthy standard, and a very careful examination failed to *detect any physical signs whatever.*

This case was published in the 'Lancet,'* Aug. 9, 1856, and the following remarks appended by me:—'The question here arises, Was this a case of phthisis? and speaking with diffidence, when we have no opportunity of verifying the reply, I would answer, that in its history, its progressive symptoms, and its physical signs, we are bound to regard it as such.' Unfortunately the question resolved itself. Towards the end of the year 1857, this gentleman again presented febrile symptoms of a remittent character. He thought that the former diagnosis had been wrongly made, and put himself under homœopathic care, till within a week of his death; so that nothing was done for him. He died in July 1858, of pneumothorax, the result of the rupture of a cavity in the right apex; and the physical condition was ascertained by the late Dr. Todd, Dr. Watson, and by myself.

Necessary considerations in examining a case of supposed phthisis in the earliest stage.

If we examine the circumstances out of which the disease is supposed to arise, with a view to their analysis, we shall only get a negative help, or at best a general and abstract truth, from which it is difficult or impossible to reason down to the individual case on which we may have to decide. Nevertheless, the following are considerations which we must mentally include in our reasoning:—This violent disturbance of the system, is it due to recent acute disease yet unresolved? to a pleurisy or pneumonia undetected, for instance? Physical evidence here decides.

May originate in acute disease.

But has the subsidence of an acute disease been followed by this train of symptoms instead of by a conva-

* *Lectures on the History and Constitutional Characters of Phthisis,* delivered at the Hospital for Consumption, by J. E. Pollock, M.D. 'Lancet,' Aug. 9, 1856.

lescence? If so, the chances are that the threatened disease is tuberculous.

The following tables give a view of 76 cases of phthisis distinctly originating in acute disease, which occurred in my own practice. Table 1 gives the acute diseases in the order of their frequency as originating causes; Table 2, the ages:—

TABLE 1.

Acute Disorders.

	No. of cases.
Fever, originated	17
Rubeola	14
Pertussis	13
Pneumonia	10
Scarlatina	8
Variola	6
Pleurisy	4
Influenza	2
Dysentery	2
Cholera	2
Ague	1
Boils	1
Diphtheria	1
	*81

TABLE 2.

Ages when attacked.

Age under	No. of cases.
2 years	2
3 „	5
5 „	9
10 „	12
15 „	7
18 „	3
20 „	4
25 „	7
30 „	5
35 „	6
40 „	8
45 „	4
50 „	3
51 „	1
	76

Of these 76, 18 had hereditary predisposition to phthisis. The first Medical Report of the Hospital for Consumption gives the parental predisposition as existing in 24½ per cent. of all cases of phthisis. It will be remarked how fever stands at the head; measles and hooping-cough coming next; while pneumonia and pleurisy are less active agents than fever.

Fever.

The rheumatic and gouty constitution deserves a separate and careful consideration, for it is undoubtedly intimately associated in certain instances with the tubercular. In the Hospital for Consumption, out of 1973 cases of phthisis, 275 had previously had rheumatism.†

Rheumatism, gout, and disease of the heart with phthisis.

* Of these, 5 had two affections consecutively.

† 2nd Report, 1863.

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In my own practice,* out of 67 cases of rheumatism in persons affected with tubercle, 49 had rheumatism before, and 18 had it after phthisis was established; and it is not uncommon to have to treat acute rheumatic fever in the wards of the Consumption Hospital. The allied affections of gout and disease of the heart are often present in tubercular phthisis. It does not appear that rheumatic fever often directly leads to tubercle, but it is sufficient for our present purpose to remark, that the two temperaments very frequently go together, the phthisical patient having attacks of rheumatism, and the rheumatic falling into consumption. Rheumatic parents frequently also beget tubercular children, and *vice versâ*.

In certain rather rare instances, I have noticed the gradual occurrence of murmurs over the aortic and mitral valves, coincidently with the slow development of tubercle in children of the strumous habit.

Case.

A. A slender boy of 14 has been under my care since he was 8 years old, for enlarged glands and tonsils. Two years ago, with slight, dry cough and sub-febrile symptoms, a deposit in the right lung took place, evidenced by dulness, bronchial respiration, and dry crackle under the clavicle. These signs are persistent, excepting the crackle, which is replaced by a coarse character of respiration and loudly prolonged expiration. There is some flattening of the chest walls at this side. He is thin, and has never regained flesh. Within a month there has been gradually developed a rather rough systolic aortic murmur, very distinct in its character from that caused by anæmia. He has no systemic disturbance, excepting that the pulse is occasionally up to 90. He has severe dyspnœa, and complains of slight pain in the cardiac region occasionally. I presume that a partial thickening of the valve has occurred, analogous to that which results more rapidly from acute rheumatism.

Age in acute diseases.

The ages at which acute diseases induced phthisis should be remarked. From 3 to 15 (the ages when epi-

* See the chapter on 'Rheumatism and Phthisis.'

demic disorders of children most prevail) is the greatest frequency, and from 20 to 40 when fever is most common.

The prognosis for duration is not good in this class of cases, as will be noticed hereafter.

Pregnancy and lactation. Causes.

The influences of pregnancy and of lactation as originating causes of phthisis deserve to be considered.

The following are the results of my observations on 155 cases of phthisis in patients who had recently been confined:—

	No. of cases.
Phthisis existed before pregnancy, in	56
„ began during pregnancy, in	48
„ began at confinement	51
Total	155

As regards lactation as a cause, 94 cases were carefully investigated, with the following result:—

	No. of cases.
Phthisis began during lactation, in	54
„ „ from weaning period	16
Lactation for 1 year, as apparent cause	10
„ over 1 year „	11
„ „ 2 years „	3
Total	94

Hæmorrhage a cause.

In five well-marked cases hæmorrhage at labour appeared to be an exciting cause. While on this subject I endeavoured to ascertain the fecundity of the parent, as judged by the number of children and the influence of frequent confinements as a cause of phthisis. In 210 cases in which the commencement of the disease was associated with pregnancy or lactation, the number of children was as follows:— Number of children.

	No. of cases.		No. of cases.
1st pregnancy	49	8th pregnancy	4
2nd ditto	36	9th ditto	2
3rd ditto	43	10th ditto	2
4th ditto	26	11th ditto	1
5th ditto	23	14th ditto	1
6th ditto	13		
7th ditto	10	Total	210

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This table shows both the number of the pregnancy at which the disease manifested itself, and also the number of children born to a phthisical parent. It will be seen that 49 cases of phthisis occurred at or near the time of the first pregnancy, 36 at the second, and so on.

From a consideration of these observations, it may be concluded that the period of gestation and of delivery, as also that of lactation, especially when prolonged, is fraught with peculiar danger to individuals predisposed to phthisis. And there can be no doubt that the disease not uncommonly begins at such times. The peculiar state of the vascular system and of the blood itself during pregnancy, the rapid reduction of the volume of the uterus after labour, whereby the blood is loaded with fibrinated material, and the reduction of all the tissues of the body; the hæmorrhage at the time of labour, and the subsequent drain on the system by lactation, which can be but badly afforded in persons of weakly habit, are all conditions predisposing to the commencement of organic disease. In forming an opinion on cases of early phthisis, therefore, regard must be had to the influence of pregnancy and lactation.

Malaria.

If malarious influence has been present, the diagnosis of tubercle is far less likely, as we recognise in the marsh poison a sufficient cause to account for the phenomena. The concurrence of the phenomena of malarious affections, even of the minor kind, with tubercle in the lung, is most uncommon. During a residence of seven years in Rome, which is a well-known resort for phthisical invalids, I never saw or heard of a case of intermittent fever in persons affected with consumption; and although the tendency of all minor ailments there, as neuralgia, headache, &c., is to assume a remittent form, a marked immunity in this respect for the phthisical was very observable, while

Its antagonism to phthisis.

among the healthy English residents there were abundant cases of disease directly dependent on, or modified by, malaria.

Gastric and other affections produce like symptoms.

The prolonged gastric disorder of adults and of children, severe dyspepsia, involving the secondary processes, and depurating organs (kidneys and liver), and all local affections, as of joints, chronic abscess, syphilis, the cachexia of mercury, the mesenteric disease of children under 15, are to be looked for in every case. It is scarcely necessary to add hysteria to this list.

Bronchitis.

The symptoms of prolonged bronchitis are liable to be mistaken for those of this period of phthisis, but more commonly for a later stage of the disease. The history, physical condition of the chest, and the nature of the expectoration, should guide us, and in most cases a safe conclusion may be drawn; but bronchitis, in certain instances, passes into a form of phthisis, and at the phthisical age (as well described by Bennett), or in old age (Maclachlan, who says that 'senile phthisis is usually a sequence of chronic bronchitis'). These obscure cases must be allowed for in our prognosis, and our highest skill will often be taxed to account for certain phenomena present. It is to be remembered that the cough of the earliest stage of tubercle, if present at all, is dry and irritative, and that expectoration is generally absent, and it should never be forgotten that it is for constitutional disorder and not for local symptoms that we have to account.

Absence of assignable cause.

The absence of assignable cause is a most important element in our obscure cases. Having eliminated all affections likely to be confounded with phthisis, having considered all the causes likely to originate it, we may have a residual severe constitutional disorder without antecedent disease or apparent origin, and can at once refer to tubercle as the probable pathological disturbance impending.

We shall do well to remember also, as before stated,

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that phthisis very rarely begins with the symptoms of catarrh.

Phthisis rarely begins with the symptoms of catarrh.

When we have thus reasoned out and reduced our evidence to form, we have to consider the age, the inherited tendencies, the individual constitution and former ailments of our patient, and the duration and sequence of his present symptoms.

The negative attitude of phthisis.

Nor should we omit from our consideration the negative attitude of phthisis, and its isolation with regard to other diseases. According to very numerous observations, it is ascertained that phthisis is rare in persons actually the subject of open strumous abscesses. It may occur before the glands are affected, or after cicatrisation, but it is not often found to begin during their suppuration. Also, although there are individual exceptions, it is not common in those who have had external glandular disease.

Non-concurrents.

External struma.

The frequency of strumous affections in phthisis is represented in the following table, on a total of 300 cases of tubercle in the lung, occurring in individuals of marked strumous temperament:—

	No. of cases.
External glands, enlarged	33
„ „ ulcerated	5
Diseases of joints	8
„ eyes	2
„ mesenteric glands	21
Cerebral	6
Spinal disease	12
Lumbar abscess	2
Total	89

It will be observed that these figures represent the instances occurring in 300 persons of marked strumous habit, but these are taken out of 4530 cases of phthisis.

Rachitis.

Phthisis is rarely found in persons with rachitic deformity of the chest, or rickets generally. My own experience, and that of my colleagues, amply confirms

* See also the chapter on 'Strumous Phthisis.'

this statement. The deformed chest is very uncommon in the consumptive. It may not be out of place here to state, that phthisis, although ordinarily found in individuals of the well-known consumptive build (narrow, flat, and long chest and alar scapulæ), also occurs where every measurement is ample, and the chest cavity is fully developed.*

Form of chest.

Skin affections of almost every form, especially those accompanied with febrile action of the system, are most rarely found in the phthisical habit, and at the period of the invasion of phthisis. The parasitic and contagious varieties may appear, and chiefly in children, but the constitutional (as psoriasis) are very uncommon. Herpes, urticaria, pityriasis, and acne, may be considered exceptions. The state of the skin in the phthisical is to be remembered. It is generally delicate in texture, rarely freckled, is soft to the touch, and the perspiration easy. As hectic advances it is paler, softer, and anæmic. The openness of the pores, and extreme readiness to perspire, would almost seem to be a safeguard against skin disease.

Skin diseases.

Tumours of all kinds are rare in phthisis, the cystic† as well as other varieties. I have, however, frequently met with bronchocele.

Tumours.

The peculiar condition of the blood called anæmia,

* See, for many interesting remarks on this subject, Dr. Cotton, *Phthisis and the Stethoscope*, 3rd edition, 1864.

† I give Rokitansky's list of non-concurrents with phthisis; but the text records my own experience:—

Cystic formations.
Tumours.
Coarctation of the thoracic space (by pregnancy, ovarian tumours, &c.), bronchocele, typhus, intermittent fever, aneurism, rickets, venosity—whether a preponderance of venous blood in the system or from congenital cyanosis, hypertrophy of the heart, emphysema, dilated bronchi. (See Rokitansky, Sydenham, Ed.)

I have seen tubercle combined with enormous ovarian tumour (through the kindness of Mr. Spencer Wells), and in several instances have verified the existence of patent foramen ovale in cases of phthisis, both when cyanosis had occurred during life and where this symptom was absent.

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Anæmia, a non-concurrent.

deserves careful consideration in our study of the premonitory stage of phthisis. Its characters are well-known and easily recognised. Excessive pallor of skin, tongue, and conjunctivæ; a delicate texture of skin, with a colour often shading off into olive; small and often rapid pulse, easily excited, but soon subsiding; deficiency of the catamenia, and paleness of the discharge; dyspnœa on exertion; short dry cough; œdema of the ankles; faintness or positive syncope; deficient and enfeebled nervous power; pain in left side; digestion impaired; tongue pale and flabby; bowels very costive. With these symptoms we have a blowing murmur over the aorta accompanying the systole, and frequently a venous murmur or whiz in the jugular. The blood itself is thin and watery, and deficient in red particles, but has an excess of white corpuscles.

Of all the conditions of health to which the name of consumption has been popularly given, this one is most commonly taken for a manifestation of tubercular disease, and is that which least frequently is found associated with phthisis. I have carefully noted 125 cases of anæmia with murmurs, but in none of them was there any sign of tubercle, while in a very few instances have I observed the concurrence of the two conditions. These patients are very numerous, and afford by their number abundant opportunities of testing the truth of the above observation, which, so far as I know, is original. The girl with extreme anæmia is always supposed to be consumptive; but a glance will often enable us to decide on the real nature of the case. The diagnostic points are these. In this affection the build of the patient is generally antiphthisical, and in spite of her colour and delicate appearance, there is neither loss of flesh to any great extent, nor fever. The presence of the murmurs (arterial, venous, or both) will decide as to the existence of extreme anæmia. On the other hand, the mobility, percussion, and tone

of the respiratory sounds are normal, and this even where cough, dyspnœa, and hæmoptysis may have existed for months. The important blood changes which characterise this condition seem almost antagonistic to tubercle; for not only is phthisis not a concurrent state, but these cases very rarely proceed to the development of tubercle in the lung. When we regard the causes of anæmia, although they belong to that class to which consumption is commonly attributed, yet they are more peculiarly referable to two errors against health—seclusion from air and light, and a wrong quality of food. The sufferers are the victims of our subterraneous kitchens and back shops, and of that atrocious domestic system which deprives young women in service of open-air exercise and enjoyments peculiar to their age. Secondarily, a depraved appetite arises, and tea with bread and butter comes to form their sole diet, as all healthy desire for meat soon vanishes. These devitalised plants, which never see the sun, languish in nervous power, and furnish our worst cases of hysteria. The nutrition of the body, however, does proceed, and although the blood has become impoverished, the tissues scarcely waste, but become loose and flabby, and organic life is insufficiently nourished.

Contrasts between anæmia and phthisis.

Reasoning theoretically, we may say that anæmia consists in a deficiency of certain necessary ingredients in the blood, while phthisis may have a similar deficiency, but has also a superadded contamination. Comparing symptoms, anæmia wastes those organs and tissues dependent on an abundant supply of red blood; phthisis wastes all tissues by furnishing them with impure blood, and leaves a residual deposit. The phenomena of anæmia are those of insufficiency; those of phthisis of impurity of the vitalising fluid.

The results of both classes of disease are more strikingly divergent than their symptoms. Few disorders

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of blood origin are so manageable as anæmia. Fresh air, light nutritious diet, exercise to promote blood changes, and the metallic tonics with warm aperients, do wonders for these poor faded plants, which so remind us of London gardening! In phthisis we have to eliminate a poison as well as to restore lost healthy constituents of the blood. Hence the uncertain issue of our cases, the slight contamination of some terminating in minute deposit tolerated for years; the more acute constitutional disorder in others, rapidly fatal; or the deposit softened, excavated, and the patient righted for the time. These and other results of tubercle, which are to be again treated of, illustrate the nature of the early disorder; but for purposes of prognosis and diagnosis sufficient has been said. Anæmia and phthisis are rarely coincident, and the exhausted state of blood in the former need never be confounded with consumption. The anæmia induced in the more advanced stages of phthisis is not here alluded to; the blood gets drained of its red particles in tubercular as in all chronic affections; but we are now treating of the earliest and premonitory symptoms.

Hereditary predisposition.

Considerations derived from the hereditary constitution of the patient may assist us much at this stage, when we are without the means of forming a physical diagnosis. Parental disease, the age at which the tubercular habit was developed in the parent, or in the brothers or sisters of the patient, the likeness of the latter to father or mother, and a memory that males transmit disease with much greater tendency to sons, and females to daughters,* are considerations which will help in our diagnosis.

The liability to disease which is inherited from

* Fathers transmit diseases to sons in 59 per cent. of cases.
" " daughters in 43 " "
Mothers " to daughters in 56 " "
" " sons in 40 " "
—1*st Rep. Hosp. for Consumpt.*, 1849.

several progenitors is greater than when one only transmits the tendency. Thus, two parents phthisical are more likely to have consumptive offspring than when one only has been phthisical; and the greater the number of collateral relatives so affected, the higher the danger to which an individual standing lower in the family tree is subjected. In regarding the inherited predisposition to disease, the generation immediately preceding is of the first importance (as parents), then those a step higher (as grand-parents). The deaths of brothers and sisters from phthisis evidence a strong family tendency, but the originators of that tendency are the parents and more remote ancestors. There is little doubt also that forms of disease are transmitted. I know of families whose members were successively swept off by acute phthisis as they arrived at the same age, and of others where the chronic type of disease prevails, and its individuals struggle on to middle age with cavities in the lung. The hæmoptysical temperament is commonly shared by several members of the same family, and successive individuals die of profuse bleeding from the lungs. A most remarkable and fatal case, with persistent and distressing fits of coughing lasting for five and six hours consecutively, and entirely uncontrolled by remedies, which was long under my care, was succeeded in the same family a few years later by the son of the lady, with precisely the same symptoms. But illustrations of this fact are familiar to every one in practice. It is well in all instances to ascertain the type of disease which prevailed in older members of the same family, or in brothers and sisters, as our prognosis will be much assisted thereby.

Forms of disease transmitted.

The following diagnostic summary will assist:—

1. Emaciation not to be accounted for by recent acute disease, ordinary dyspepsia, or alterations

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in the habits of the patient; progressive, unaffected by the quantity of food taken.

2. Fever of the remittent type, chilliness, dry heats, sweats sometimes profuse, more commonly partial, pulse over 100, with exacerbations morning or evening, the last more common.
3. Grave disorders of digestion, nausea, anorexia, thirst, furred tongue, early occurrence of diarrhœa, in certain instances great acidity of the primæ viæ. This class of symptoms belongs to phthisis of the acute form.

The symptoms included under these three heads to be regarded with great suspicion. The following circumstances to be carefully analysed as causes:—

4. Recent acute affections not followed by perfect convalescence, yet which have not left distinct organic changes (as unresolved pneumonia, pleurisy, &c.). Among those most to be dreaded are fever in all its types (excepting the pure intermittent), and eminently the zymotic class.
5. The existence of the rheumatic diathesis in the individual or in his parents.
6. In the female, pregnancy; recent confinements; hæmorrhage at labour; prolonged lactation in those hereditarily predisposed to tubercle.
7. The presence of prolonged bronchitis, which may pass into phthisis; this is more common in the aged.
8. The hereditary tendencies, their number, nearness of relationship, the age at which parents, brothers, sisters, were attacked, and the forms of their diseases.
9. The absence of assignable cause for grave alterations of health.

10. The occurrence of the symptoms without preceding catarrh.
11. The conditions rarely concurrent with tubercle to be remembered, are :—
    a. External suppurating strumous glands.
    b. Emphysema of the lung.
    c. Rachitis.
    d. Skin diseases.
    e. Tumours.
    f. Anæmia, with the characteristic murmurs.

Prognostics.

The prognostics remain to be briefly stated. In this period of the disease they resolve themselves into simple diagnosis. In the consideration of the premonitory symptoms of any affection, where the primary question to be resolved is the presence of the disease at all, it is difficult to assign a value to the varying conditions of the case. Is this phthisis? is our problem before stethoscopic evidence is possible; and having established something like certainty about the nature of the impending disorder, we shall do well to be reticent in opinions offered about its termination. Nevertheless the following may be remembered :—

Insidious form more likely to become chronic.

a. The insidious form of phthisis, scarcely announced in its beginnings, is more likely to become chronic than that which invades with acute access of fever.

Acute symptoms.

b. The acute form is ushered in with much febrile action, and considerable gastric disturbance; the chronic rather by a gradually progressive emaciation than by fever.

Sweats.

c. Severe sweating is indicative of rapid cases.

Phthisis in advanced life.

d. Very slow emaciation is most frequently seen in the phthisis of advanced life, the changes in the nutrition of the body generally proceeding to a great degree before local disease is established.

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Phthisis succeeding acute affections.

e. Phthisis succeeding acute affections,* as fever, rubeola, &c., generally belongs to the tolerably rapid form of the disease, but not inevitably to the most acute.

After pregnancy.

f. Phthisis after pregnancy, and during lactation, is generally rapid.

Rheumatic temperament.

g. The rheumatic temperament tends to chronic rather than to acute phthisis.

Hereditary tendencies to certain forms of disease.

h. The multiplication of hereditary tendencies in a single case, has more a diagnostic than a prognostic value. The *form* of phthisis which prevailed in other members of the same family may help us to estimate the probable future of the case. If two or more brothers have had, say, chronic phthisis, the chances are in favour of the development of the same type of the tubercular disorder; if a brother or sister has been struck down by the acute variety at the same age, we may fairly anticipate a similar progress.

Absence of assignable cause.

i. The absence of assignable cause for any case presenting the features of early consumption, is a feature favourable for chronicity. Where neither individual temperament, previous disease, nor hereditary tendencies are present, the prognosis for a slow rather than an acute form of the disease may safely be formed.

Non-concurrents present.

j. Where any of the conditions rarely concurrent with phthisis are observed, as emphysema, &c., the consumptive disease is often latent, and generally slow.

* In 72 cases of this class, the average duration of which, when under observation, was 22·78 months, 19 were in the first, 32 in the second, and 21 in the third stage. Of 6 deaths, 1 occurred within 6 months, 1 within a year, 1 in 2 years, 2 in 4 years, and 1 at the end of 5 years from the commencement of the disease. The deaths occurred between the ages of 5 and 18 years of age. The predisposing diseases were pertussis, which caused 3 deaths; pneumonia causing 2; and rubeola causing 1 death.

CHAPTER VII.

ACUTE PHTHISIS.

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UNDEVIATING continuity of the morbid actions is the character of this form of the disease. I distinguish two varieties: 1. The *acute inflammatory*, in which the local disease is a combination of inflammatory products and of tubercle; 2. A passive exudation of crude tubercle invading the whole of both lungs, with slight febrile disturbance. The first may prove fatal in a few days or be prolonged over some months, and the latter duration is more common; the second is fatal in a few months. The history of the first is continuous fever, with exacerbations, but without remissions; rapid hard pulse, becoming feebler and quicker; great heat and irregular sweats, early gastric and intestinal disturbance, sometimes from the first; shown by red tongue, thirst, nausea, vomiting, anorexia, diarrhœa, rapid and continuous waste of tissues, great exhaustion, restlessness, dyspnœa, occasional delirium when near the fatal close. The physical signs may indicate an extensive deposit in one or in both lungs simultaneously, shown by dulness on percussion, bronchial respiration and voice, and prolonged expiratory sound; and the evidence of deposit is not localised to one spot as at the apex, but is diffused, often very extensively, and may be more intense at the base. The signs of softening are early present; the stages of the disease being indeed undistinguishable, fine crepitus appearing in patches, mixed with bronchial sounds, clicking, coarse râles, pleural frictions, and,

Two varieties.

Acute inflammatory.

Symptoms.

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finally, evidence of inflammatory action in all the tissues of the lung. Should cavities form they are irregular, undefined excavations, and the signs run into those of softening; the circumscribed form of cavity I have never seen.

Passive exudation.

2. The passive exudation of crude tubercle is distinguished by all the physical signs of deposit in the lung without softening, great dulness all over the chest, fixity of its walls, deficient respiratory sounds, followed speedily by bronchial respiration and voice. The moist sounds are absent or developed in portions of the lung, only not intensely. A general malnutrition of the body, rapid waste, sub-febrile condition, no excessive sweats, skin hot and dry, are the symptoms. The digestive system often remains unimpaired to the last. Death occurs in three or four months. This is a rare form of tubercular disease, and, according to my observation, is seen only where the hereditary taint is strongly marked.

Acute Inflammatory Phthisis.

Description.

In 1816, Cruveilhier writes ('Essai sur l'Anatomie Pathologique'; Paris, 1816, tome ii. p. 167):—'La forme de phthisie pulmonaire que je viens d'indiquer ne se trouve décrite dans aucun auteur moderne; en lisant le premier livre des epidémies d'Hippocrate, j'en ai rencontré une description très-exacte.' He then quotes the following passage from Hippocrates, which I subjoin in English from the Sydenham edition:—

'Consumption was the most considerable of the diseases which then prevailed, and the only one which proved fatal to many persons. Most of them were affected in the following manner: fever, accompanied with rigors of the continual type, acute, having no complete intermission, but of the form of the semitertians, being milder the one day, and the next having an exacerbation, and increasing in violence; constant

sweats, but not diffused over the whole body; extremities very cold, and warmed with difficulty; bowels disordered, with bilious, scanty, unmixed, thin, pungent, and frequent dejections. The urine was thin, colourless, unconcocted, or thick with deficient sediment. . . Sputa small, dense, concocted, but brought up rarely and with difficulty; and in those who encountered the most violent symptoms, there was no concoction at all, but they continued throughout spitting crude matters. The fauces in most of them were painful from first to last, having redness with inflammation, defluxions thin, small, and acrid; they were soon wasted and became worse; having no appetite for any kind of food throughout; no thirst; most persons delirious when near death.'

Case of Acute Phthisis.

'Dr. Law did not believe that the records of medicine afforded an instance of any case of the kind running its course as rapidly as this had done, its duration being only ten days.' Case.

The subject of it was a boy æt. 5 years. Was reported never to have been strong; had had dropsy twice. Strikingly handsome, fine delicate skin, light hair, blue eyes. Seized with shivering and general sickness, after being out playing all day. When admitted, urgent dyspnœa, face deeply congested, skin burning hot, pulse 160. *Posteriorly, dull percussion from top to bottom, both sides and to the same extent, bronchial breathing, with large coarse crepitus.* Death on the sixth day after admission, and tenth day of his illness. Each lung was from apex to base in a condition of pneumonia, intermediate between the first stage, or that of hyperæmia and red hepatisation, with small tubercles scattered through them, but more crowded near the base. The anterior margins of the lungs were emphysematous, and in these portions alone there were no tubercles. The bronchial mucous membrane was universally congested.

Dr. Law thought if ever a case deserved to be called one of acute phthisis, it was this. It exhibited, in a

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very striking manner, the peculiarity of the tubercles being even more numerous at the base than at the apex of the organ, and deposited equally in both lungs. He was well assured that the child had no indication of chest affection before this attack. Dr. Law was disposed to consider the pneumonia and tubercular deposit in this, and in all cases of acute phthisis, as a simultaneous result of a single pathological effort, and very analogous to what occurs in inferior animals, in whom disease runs a much more rapid course than in the higher, although the former are much less susceptible of it than the latter. Nor is it alone in running its course within a shorter time in the lower than in the higher animals that the disease differs; but in this, that in the latter there is a kind of gradual development of it, consisting, as it were, of distinct stages. In the lower animals these all run into each other. In the pulmonary disease affecting cattle in this country it was common to find the lungs of animals that had died after a very few days' illness, in a state of hepatisation, with tubercles in the midst of the hepatised lung. He remarks that although it is quite true that tubercles act as foreign bodies on the pulmonary parenchyma in the midst of which they are deposited, and produce around these an areola of pneumonia; still, while he admitted this, he also believed that pneumonia was the precursor of the tubercular deposit.*

Case 2. B. æt. 13. Fair hair, delicate complexion, well nourished. In September, leading a healthy country life, in full vigour, taking daily horse-exercise; living well. Wasting, first symptom, which rapidly progressed, and excited alarm. In Feb., when I saw him, dry cough, dyspnœa, daily chills, sustained high pulse (120), sweats partial, great heat of surface, anorexia, nausea, but rarely to vomiting, bowels regular, t. furred, great thirst, extreme feebleness, and much marasmus. *Dulness,*

* Dr. Law. *Reports of the Dublin Path. Soc.; Dub. Quar. Jour. Med. Science.* May, 1864.

gurgle, cavernous blowing for three inches below right clavicle: dulness, moist crepitus, tubular respiration for some inches left apex, over the remaining parts of both lungs, rough, coarse tone of inspiration; expiration prolonged and loud, with occasional click everywhere. The usual remedies failed to produce even transient relief; oil and tonics were not even tolerated Death in March from exhaustion; no delirium. There had scarcely ever been expectoration. Duration, six months.

I have placed these cases at the head of this section, as typical of the most acute forms of phthisis. The Hippocratic description* wants only physical signs to render it a complete history, and merits the comment of Cruveilhier: 'Admirons la sagacité d'Hippocrate, voyons le reconnaître la phthisie au milieu de tant de symptômes bien propres à lui donner le change. Que serait-ce s'il avait pu, comme nous, interroger les cadavres?' It is incomplete, but worthy of study, as representing the leading features of acute phthisis; the continuity of the fever, the accesses being so reduplicated as to run into one another, and daily increasing in violence; the deep disorder of digestion; the paucity of what we would call 'chest symptoms,' and the persistent waste of vital force. All these are characters of the gravest constitutional disorder, proceeding to a fatal result, with no check or intermission.

Dr. Law's case is of the highest interest. A delicate strumous child is attacked by what would have been an ordinary pneumonia in a healthy subject. Death occurs on the tenth day, and tubercles are found throughout both lungs, the interspaces being blocked up with inflammatory products; and we cannot but agree in the opinion that the pneumonia and tubercular deposit in this and in all cases of acute phthisis 'are the result of a single pathological effort.'

* It is obvious that the type of fever in the Hippocratic records is the intermittent, dependent on malarious influence; and all ancient descriptions of febrile disorder seem to be referred to this standard.

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Acute phthisis of this form must indeed be regarded as composed of these two elements—an inflammation of acute violence, and a constitutional disorder which determines a deposit in the lung of the lowest grade of aplastic formations. The local disease is a combination of inflammatory products and of tubercle, the systemic affection reflects both disorders, and the patient dies from continuous febrile disturbance. Such cases are of frightful rapidity, but they are fortunately rare.

The second case exhibits the more common form of acute phthisis, and the differences between it and the first are to be observed rather in duration and intensity than in kind. The same continuity of febrile disturbance and deep impairment of all the processes engaged in nutrition distinguish it, while the local changes are found in an extensive deposit throughout both lungs, which (the disease being prolonged over a greater time) may in portions have reached the stage of excavation. The inflammatory products were also found in every tissue of the lung, red hepatisation, intense congestion of the bronchial membrane, and thickened pleura. Above all, it is to be remarked that there are none of those barriers to the advance of the tubercular deposit which in our cases of prolonged character are found as a result of conservative inflammation below and around limited areas of tubercle, walling and separating it off, and circumscribing its progress. The lung in such cases is friable, congested, and disorganised in all its tissues.

Passive Exudation of Crude Tubercle.

Passive exudation. Case. Post mortem.

G. H. æt. 17. A delicate-looking lad, narrow and shallow in the chest. Came to Rome with his family to pass the winter. His parents had left England for the health of a daughter declared to be consumptive; and had already lost three or four children by phthisis. This boy was apparently perfectly well on arrival; he rather suddenly, and without

any apparent cause, began to lose flesh and strength; and this proceeded so rapidly that, in the course of two months, he had the aspect of advanced phthisis. His appetite was unimpaired, and he daily rode on horseback; he had no cough, no expectoration, no hæmoptysis. Pulse small, weak, rapid. He began to have chills and moderate night sweats about a fortnight before his death. Physical signs—*the whole chest duller than natural, and this dulness increased daily till it was very manifest. The respiration, at first deficient, was dry and tubular throughout, the voice bronchial. Remarkable impairment of the mobility of the chest on both sides. It appeared fixed down.* Dyspnœa on the slightest exertion was his only distressing symptom. He faded rapidly away, and died within three months; without any secondary affections, as diarrhœa, and without gastric disturbance. He also had *never expectorated anything whatever.* Towards the end he coughed a very little—not sufficient to attract the notice of any one, nor to distress himself. I examined the body with Dr. Deakin, twenty hours after death. The entire extent of both lungs was solidified by a deposit of grey and yellow tubercle throughout their whole structure. We had no leave to examine the other cavities of the body.

This case is also rare, and it belongs to the class of acute phthisis rather from the undeviating continuity of its course to a fatal result, than from the active nature of its symptoms. The whole of both lungs was invaded by tubercle, but the inflammatory products were wanting, and the febrile disturbances slight. It was almost a passive deposit. Here are to be remarked the singleness of the disease (it was tubercle alone), the marked family taint, the absence of secondary affections, the absence of fever, the progressive waste, the entire obliteration of respiratory space, and the persistence of the deposit in a solid form. *The patient died in the first stage of phthisis.*

Analysis of 179 cases.

I have noted personally 179 cases of rapid continuous phthisis, of which 113 were males and 66 females. The proportions of phthisis (all forms) in the sexes is 53 per cent. males to 47 per cent. females, in

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the Registrar-General's report; and, in the First Report of the Hospital for Consumption, it stands 61 per cent. for males to 32 per cent. for females. My observations give 63·13 per cent. of males and 36·87 per cent. of females in this form of the disease.

The influence of age and sex is given below.

Age.	Males.	Females	Age.	Males.	Females
Under 7 yrs.	0	1	20 to 25 yrs.	25	13
7 to 10 „	0	1	25 „ 30 „	24	21
10 „ 15 „	2	0	30 „ 35 „	22	5
15 „ 16 „	2	2	35 „ 40 „	9	7
16 „ 17 „	6	3	40 „ 45 „	6	2
17 „ 18 „	5	5	at 55 „	1	0
18 „ 19 „	4	4			
19 „ 20 „	7	2	Total . .	113	66

Age.

The age at which there is greatest proclivity to this form of phthisis is from 20 to 35 in both sexes, but men exhibit a greater liability than women after that age. There is no immunity even in advanced life. A case, æt. 63, was fatal in 3½ months with formation of cavity. Maclachlan (*Pract. Treatise on Dis. and Infirmities of Advanced Life*: Churchill, 1863) gives a case—male æt. 73; death in less than 3 months, and within 6 weeks of cavities forming. Hasse gives a rapid phthisis case, æt. 89, male; and Blakiston a case, æt. 73; death in 6 weeks. Of my 179 cases, 8 died while under observation, of which 4 were males and 4 females; the fatal result in the males occurring between 35 and 45, in the females between 18 and 30:

Two died in 2 months.
One „ 3 „
One „ 4 „
Three „ 6 „
One „ 9 „

Time in which each stage was reached.

I subjoin a Table, showing the time in which each stage of the disease was reached in 172 cases, and the

period also in which the opposite lung became engaged in 139 cases :—

Time.	Stage 1.	Stage 2.	Stage 3.	Both lungs engaged
1 month	1	3	0	2
2 months	1	8	13	13
3 „	2	13	33	32
4 „	0	7	24	26
6 „	2	9	29	26
9 „	0	5	22	20

As a record of the extent of local mischief this is intelligible enough; e.g. at the end of two months 13 had cavities; 13 had both lungs affected; 8 were in the stage of softening, and one was still in the first stage. The proneness to destructive change in the tubercle is sufficiently marked.

Hereditary influence.

The influence of hereditary predisposition on these cases is undoubted. Out of 179 only 34 could positively state that there was no family taint either parental or remote.

Rarity of hæmoptysis.

Examining symptoms, we find that 82, or nearly one-half, had no hæmoptysis, whereas the proportion with this symptom in both sexes and all forms of phthisis was found to be 63 per cent. (*First Med. Rep. Hosp. for Consumption*). The discrepancy favours the idea that the inflammatory congestion of the lung is relieved when blood exudes, and certainly points to local depletion as a remedy indicated by the symptoms. In most cases of phthisis a slight spitting of blood undoubtedly relieves the patient for the time, by lessening congestion and irritation of the lung tissue.

Gastric symptoms.

Gastric irritation and diarrhœa are early, prominent, and alarming symptoms in acute phthisis. In my cases, 97 (out of 179) had marked gastric disorder, thirst, anorexia, nausea or vomiting, and red tongue from the beginning.

Diarrhœa.

Diarrhœa was present in 27 cases within the first three months, and in all at some period of the disease.

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Fever.

Continuous febrile disturbance, pulse above 100, chills, excessive heats, not always ending in sweating, or with profuse sweatings, were symptoms present in all cases.

Out of 64 females above the age of puberty, the catamenia were absent in the first three months of illness in 28; and it will be found that this function rarely continues in acute febrile phthisis.

Prognostics.

1. Rapid continuous waste of tissues.
2. Continuity of febrile disturbance with exacerbations; no clear intermissions.
3. Early gastric and intestinal disturbance.
4. Physical evidence of diffused deposit in the lung, and of inflammation of its tissues, the signs of each being with difficulty distinguished.
5. Rapid changes in the physical signs, and those of all stages being found simultaneously in one or both lungs.
6. Marked hereditary taint.
7. In females, early suppression of the catamenia, or their non-appearance at the age of puberty.

The concurrence of these conditions, or of many of them, stamps the disease with a fatal character. The prognosis for time is to be gathered from the intensity of the fever, and from its continuous character. The fatality of this form of the disease is unquestionable, its progress is entirely uncontrolled by remedies, and if once recognised we can but warn the friends of the patient of the inevitable result.

Difficulty in diagnosis.

The only difficulty in diagnosis is that a similar form of fever, sustained and continuous with exacerbations, and an equal amount of constitutional disturbance may arise from a rapid invasion of tubercle limited to one portion of the lung, which undergoes the changes of softening and excavation with extreme rapidity, or from

an old deposit rapidly breaking up. In this case it often happens that a prognosis, if hastily formed, may prove incorrect, as the constitutional disturbance not uncommonly diminishes, and the patient considerably recovers flesh and strength, when a cavity has been formed.

The following diagnostic points will assist :—

1. In acute general phthisis the physical signs are not limited to one spot nor to one lung, but are diffused and almost always double. With these are mixed signs of undoubted inflammatory origin, as fine crepitus, dulness at the base, râles of varying intensity, or pleural friction sounds. The gastric disturbance universally present in acute phthisis running on unchecked to a fatal course, is comparatively rare as a symptom in cases where a localised deposit in one lung is rapidly breaking up, and if present is much less intense.

2. The history of the case: evidence of a former deposit in the affected lung will be found either from the patient's account or from his medical attendant. If present, the case is at once removed from the category of acute phthisis. Other considerations, derived from the age, temperament, and hereditary taint, will occur to everyone; but the elements of a true prognosis will be found in those now stated.

Passive but Rapid Exudation of Crude Tubercle.

The prognosis is to be derived from its diagnostic features, which are peculiar and rare. The universality and rapidity of the deposit in both lungs, and the progressive waste of the system, the hereditary taint, and the absence of chest-symptoms and of acute fever, are the leading characters. I have never known such cases either to pause or recover.

CHAPTER VIII.

ORDINARY PHTHISIS — THE FIRST STAGE — ITS NATURE AND RESULTS.

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The first stage consists in a deposit recognisable by physical signs.

THE premonitory stage, with its grave indications of danger, having passed, a deposit of tubercle in the lung takes place, giving rise at once to such altered physical conditions of the chest, that certain phenomena become manifest which admit of no conjecture as to their existence, but by careful observation may have a definite value assigned to them. We shall consider the indications to be derived from these and the accompanying symptoms in detail; but it is first necessary to regard the disease now established by the light of our latest knowledge, so that knowing its natural history and tendencies, we may be prepared to form a prognosis founded on a surer basis than any merely speculative theories can afford.

Two varieties of tubercle.

The deposit which takes place in the lung may consist of at least two varieties, the grey and the yellow * tubercle; the former semi-transparent, the latter opaque and firm. The first is generally found scattered throughout the lung (at least in the early stages), and the changes which it undergoes are slower than those which take place in the yellow variety.

Yellow, more tendency to soften.

Softening is earlier in the latter, and a tendency to form aggregated masses is more observed in it. Whether from inherent tendencies to destruction, or from changes which have their origin in the adjacent structures attacking it with more facility, it is certain that the

* Rokitansky, Louis, Laennec, Carswell.

yellow variety has in it more elements of danger than the grey. On the other hand, the grey has a greater tendency to dry and contract, and yielding its animal constituents to absorption, may leave only a residuum of earthy matters in the lung. These two varieties are often mixed together, and in the advanced and destructive changes of consumption the yellow gets the ascendent, and may be found alone to represent the mischief done. Whether we believe, with Bennett, that 'tubercle is a new formation in an exuded blood plasma,' or with Addison, that it is a modification of a pre-existing texture, 'a fibrinosis,' with Rokitansky, pseudo-albuminous 'perhaps mechanically deposited,' with Prout, is not so material for practical purposes as the recognition of the fact, that it is unorganised (as all admit), and incapable of being raised to a higher, although it may fall into a lower condition; and in dealing with its characteristic properties, for our present purpose we have only to remember those which influence its history and progress in the living economy. Structurally, it is non-vascular, and may be regarded as an exudation from the capillaries, chiefly into the air vessels. (Carswell, Cruveilhier.) Under the microscope it presents granular points, corpuscles without nuclei, free fat. (Rokitansky, Bennett, Beale, &c.) It exhibits no tendency to form perfect cells, but rather abortive corpuscles, which form slowly, and slowly break down. Elementary molecules are not formed capable of further development.

Grey to dry and contract.

Theories of tubercle.

Not organised.

An exudation.

No cells capable of further development.

Chemically, tubercle is composed of animal matter, with much albumen, salts of phosphate and carbonate of lime, with a little soda. (Bennett.) Tubercle possesses no fibrous stroma, as cancer. The tissue which is occasionally seen mixed with it in expectorated matter, is disintegrated lung (Andrew Clarke), and only means that so much pulmonary structure has been destroyed. Tubercle is only capable of extension by

Chemical composition.

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Extends by increase of deposit, not by growth.

Destructive changes, chemical not vital.

Grey variety tends to cure or chronicity —why?

Yellow tends to greater rapidity and danger.

Four conditions of the stage of deposit recognisable in practice.

Absorption of the deposit.

The deposit remains unchanged

an increase of the morbid matter exuded, it has no power of growth, as cancer. The destructive change which takes place in tubercle is not a vital act, but is determined by a 'conversion of the chemical components arising out of an interchange of the elements.'* Such is a brief summary of the leading facts about the nature of tubercle, on which the greatest number of the best observers seems to be agreed.

We have thus at least two varieties of deposit, which exhibit differences on which may depend the most important results. The grey scattered tubercles may remain in the lung for years, causing little irritation, having very slight tendencies to undergo chemical alterations of a destructive character, but retaining a possibility of undergoing absorption of a portion of their components. In this change they may dry and be converted into horny matters, or be decomposed and leave only a chalky residue. We have here the elements of chronicity in the stage of deposit, and such result is found in multitudes of cases in practice. The other form of tubercle, from its tendency to mass itself together, and from its greater inherent proclivity to undergo destructive changes, contains most obvious elements of rapidity and danger. Remembering, then, the tendencies of these varieties of tubercle, let us examine the history of our cases.

We shall find, in analysing numerous instances of the stage of deposit, that four conditions are possible:—

1. An absorption of the deposit, leaving the lung-structure uninjured, while the constitutional symptoms wholly subside.

2. The deposit remains unchanged in the lung, and is simply tolerated for an indefinite time, the tubercle not causing any local irritation of importance, and the constitutional symptoms subsiding. Also, no further deposit takes place.

* Rokitansky, edit. Syd., vol. i. p. 299.

3. An alteration in the deposit, by which its animal portion is absorbed, and the earthy alone remains; the change being accompanied by a termination or a material diminution of the systemic disorder. This form is either complete or partial; in the first instance, the cretified tubercle is expectorated, and the injury to the lung repaired; or it may remain imbedded in the lung for years, causing neither local irritation nor constitutional disturbance. In the partial recoveries due to cretifaction the systemic disease continues, and at some indefinite period a second crop of tubercle is deposited, part of which, at least, continues to undergo similar changes to the first, and the patient expectorates chalky matters, while some of the tubercular masses soften, and a mixed condition remains, exhibiting both the tendencies to cure manifested by the cretifaction of successive deposits, and the local and constitutional symptoms due to the ordinary process of softening.

Chemical alterations in the deposit.

Partial recoveries due to chemical changes in the tubercle.

4. The fourth termination of the first stage of phthisis is the most common, and consists in the aggregation into masses or groups of the single tubercles, which disentegrate and soften, involving the neighbouring structures of the lung in this destructive process.

Destructive softening.

The most advanced pathology recognises these results, and a philosophic prognosis must include the possibility and relative probability of their occurrence. It will be now our duty to examine the evidence on which each of them rests, and the circumstances in individual cases which render one or other of them the termination most likely to ensue.

The causes most influential, if not absolutely the only ones concerned in leading to one or other of the four results, appear to be the following:—

Causes which influence the four results.

1. The nature of the tubercle deposited.
2. The form in which it is deposited.

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3. The degree of irritation or inflammation of the surrounding structures.

4. The cessation or continuance, or the revival of the constitutional disorder, which produced the tubercle.

CHAPTER IX.

FIRST STAGE—THE DEPOSIT ABSORBED.

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Complete absorption of the deposit possible.

THE possibility of the complete absorption of the deposit of tubercle in the lung does not rest on the same kind of evidence as the other propositions. As we cannot demonstrate the existence of tubercle in the living lung, neither can we assert the fact of its removal by those certain proofs which appeal to the eye and touch. The arguments in favour of this view must be derived from other sources, and we have to appeal to analogy, to the individual facts of observed cases, and to the opinions of the ablest and most scrupulous observers. The disorder of nutrition called scrofula, which is by many held to be identical with tubercle, and by all to present striking points of analogy, when it affects the external glands, gives rise to a deposit which is capable of absorption. 'When enlarged glands in a scrofulous patient ultimately disappear, we may conclude almost with certainty that we have witnessed the cure of tubercular disease.'* Such absorptions ending in complete resolution take place under our eye daily. The analogies are to be found in the identity of the two deposits, in the slowness of its ordinary progress, either to suppuration or to cure; and in the occasional occurrence of a violent inflammation of the surrounding tissues which clears out the morbid matter and ends in a profuse suppuration, showing under our very eye the process by which a cavity is

Arguments in favour of this view derived from three sources.

Analogy with external struma.

Identity of the deposits.

Symptoms attending both.

* Carswell: *Illustrations of the Elementary Forms of Disease.* Lond. 1838.

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often formed with rapidity in the lung. In both the external and the internal disease we have often observed such rapid destruction to be followed by a wonderful restoration of the general health. The identity of the two diseases, external struma and tubercle in the lung, may be also argued from their occasionally succeeding each other, and from their alternation. It has been elsewhere pointed out, that the concurrence of external suppurating glands with phthisis is a rare event. That the tuberculous disease sometimes expends itself in early life on the lymphatic glands, to fall upon the lungs in a mitigated and limited form in old age, is the opinion of a most careful modern observer;* and many others have recorded similar observations. The constitution producing the two conditions, if not in all cases identical, is undoubtedly so in that form of phthisis which is hereditary, as distinguished from the accidental. The preceding blood disorder; the flabby ill-organised tissues; the frame and build of the individuals; the tendency to gastric disorder; the febrile remittent attacks; the subsidence of the systemic affection when the local disease has suppurated; and, finally, the well-known fact that the inherited constitution is identical, parents in phthisis producing children who have the glandular affections in early life, and others who survive the phthisical age to fall victims to tubercular consumption—are all arguments proving that the conditions of internal and external struma are only differing manifestations of the same constitutional disorder. We have, therefore, a strong argument from analogy that tubercle in the lung may be absorbed in the same manner as we witness the removal of an external glandular swelling.

Occasionally succeed each other or alternate.

Constitution identical in the hereditary form.

Features in common.

Hereditary taint the same in both.

I must add another observation from my own expe-

* Maclachlan: *Pract. Treatise on Diseases of Advanced Life.* Lond. 1863.

Absorptions of tubercle in lung occur in the strumous habit and age.

rience: that the cases in which such absorptions of tubercle are witnessed are to be found chiefly in young persons, and at the age when strumous deposits are most common. And later on are given cases which cannot fail to strike any observer as exhibiting precisely the systemic disorder which we know to accompany tubercular disease, of the same form, in the lung.

Whether instances of the absorption of tubercle, once deposited in the lung, are within the experience of skilled observers, is our next question. First, the symptoms and the physical signs must alike indicate a deposit in the lung; and a perfect subsidence of both, with all the indications of a complete restoration of the lung tissue, must follow. Such cases are within my own experience. I have many times witnessed all the phenomena of deposit, and all the symptoms of phthisis entirely removed. In children the subfebrile state has been followed by dulness of percussion, feeble respiratory sound, coarse tone of respiration, &c., and dry crepitation; and physical investigation has satisfied me of the recovery. The following cases illustrate this form of disease:—

Case 1. Ellen P., æt. 9. April 1855: Rubeola 18 ms. ago; *pertussis* one year ago, slight cough ever since; slight *hæmopt.* 3 weeks ago, dry cough, sweats, loss of flesh great, bad app., t. clean, b. reg., *dulness, bronchial voice, prolonged expiration subclav. right side*; cod oil and hydrocyanic acid. August: doing well, gains flesh, no cough. Nov.: *exp. prol., voice resonant, subclav. still,* health excellent. Feb. 1856: *phy. signs persistent,* health good; oil, with v. ferri. July 1857: in good health, much grown, no cough, *very slightly prolonged expiration only on the right side.* Duration up to this date, 4 years; oil and v. ferri taken 2½ years.

Case 2. Clara M. C., æt. 8. January 1861: No predisposition, cough for 3 months; hard, dry, at night chiefly, slight expectoration, no hæmopt., evening fever, loss of flesh and colour t. foul, app. poor, pain in right, *dulness very complete to 4th rib, bronchial whiff and vocal resonance, right*; oil and

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v. ferri. July: much improved in health, *phy. signs the same.* January 1862: health re-established, *slight roughness of respiration only on right side, percussion clear.*

Case 3. Jane D., æt. 15. May 1861: One uncle d. phth., habitual cough some months, expectoration a cupful, no hæmopt. p. in right base. Ctm. establ. at 14, now reg., app. bad, t. furred, *humid crepitus and dulness both bases posteriorly*; ol. and mist. potass. efferves. Oct. 1861: no cough, *phy. signs disappeared.*

Case 4. A. H., æt. 19. Had been out of health some months in 1846; hæmopt. rather profuse, wasting, hectic, *dulness under right clav. for three inches, feeble respn., succeeded by coarse respiratory tone.* These signs disappeared wholly by leeching and cupping, and the health and flesh slowly and steadily recovered; no cough remained. A second attack, with cough, hæmoptysis, and fever, returned the following year, and the signs reappeared. A similar disappearance of the physical condition resulted from the use of the same means. Next year she came abroad and was under my care. I watched her through a third of these attacks, when both signs and symptoms slowly disappeared. She returned to England, and died of phthisis about three years later.*

Case 5. Symptoms and signs of first stage: perfect recovery. In 1856, T. Y., then æt. 17 years, had, in common with several members of his family, a severe attack of measles. This was followed by bronchitis of unusual severity; he had cough, and copious mucopurulent expectoration, had wasted considerably, but was regaining flesh. There was still some hectic sweating, and he complained of pain in the left side. The physical signs were—*dulness of percussion note, well marked, rough, wavy inspiratory sound, attended with clicking at its close, for about two inches under the left clavicle.* By our advice, he made a sea voyage to Australia and New Zealand, remaining abroad two years, and constantly moving about while in those countries. He rode much on horseback, was exposed to all kinds of weather, and at one time led a rough life in the bush, often, as he has told me, riding for hours in wet clothes, after swimming rivers on horseback. During this time his appetite was enormous, and

* I am indebted to my former teacher, Dr. Stokes, of Dublin, for the details of the early attacks in this case, which he wrote to me at the time.

he lived chiefly on animal food, eating daily surprising quantities of beef and mutton. On his return he had grown much in height, his chest was well developed, and he was in prime muscular vigour. His general health was, in fact, most robust. On a most careful examination, *his chest presented no abnormal signs whatever*, and I had personal opportunities of repeatedly proving this fact. He has since then made many mountain tours on foot, and is a fine specimen of perfect health.

In remarking on these cases, it may be observed, that they only prove the disappearance of both physical signs and symptoms of phthisis, the total absorption of tubercle once deposited being incapable of absolute proof. In the highly interesting case, No. 4, authenticated as it is by one of our ablest pathologists, it is probable that the physical signs were due chiefly to irritation of the lung, which accompanied the deposit of tubercle; and such an interpretation would be most in harmony with the views of Dr. Stokes. To ensure accuracy in our researches, the continuous observation of cases for consecutive years is necessary, and the above have been selected as having been under my own eye for long periods.

Authorities as to the possible absorption of tubercle.

The best authorities may be said to lean towards the opinion that tubercle is capable of removal by absorption. Williams* well remarks, that a proof that the animal matter of tubercle may be absorbed, is found in the substitution of earthy particles for the organised tubercle. Carswell says 'that the important fact of the curability of this disease has in my opinion been already settled by Lænnec.' *Hardly any person is carried off by a first attack*, is remarked by Laennec, Louis, and Clark. 'There has been no doubt that modern practice has proved the curability of phthisis,' said Stokes ('Lectures' in 1835); and he added, 'it is probable that many more cases of phthisis recover

Williams.

Carswell.

Laennec, Louis, Clark.

* *Principles of Medicine*, 1856, p. 475.

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than is supposed.' The same great teacher remarked, speaking of the first stage of tubercle, 'If the patient has had any pulmonary irritation before, *and recovered from it*, it is in his favour: if it be his first or second attack, it is against him.'* Cruveilhier† says, 'Ces tubercules peuvent-ils se résoudre? Nous n'en avons pas de preuve directe pour les tubercules intérieurs, mais, comme l'observe M. Dupuytren, l'analogie doit nous en convaincre. Combien, en effet, ne voyons-nous pas de tubercules extérieurs se développer à des époques variables et disparoître par l'effet des medicamens et des moyens hygiéniques, ou plutôt par les forces de la nature au moment de la révolution générale qu'amène la puberté! Pourquoi la même chose n'auroit-elle pas lieu à l'intérieur?'

Latham.

Cruveilhier.

Conditions most favourable to the absorption of tubercle.

The conditions most favourable to the absorption of tubercle are to be considered with a view to the prognosis.

1. The nature of the tubercle deposited. If there be evidence from physical signs that we have a case of grey, scattered tubercles, few in number, as evident by alteration in the tone and duration of the respiratory sounds and by slight dulness, we are to regard the case as favourable.
2. The absence of signs of irritation in the lung, crepitant râles, much dulness, the various rhonchi, &c.
3. Phthisis not inherited; the disease accidental;‡ occurring in an individual of healthy antecedents; well-made chest; no previous syphilis nor courses of mercury.

* See also Dr. Latham's admirable *Lectures on Subjects connected with Clinical Medicine:* lect. xiii. Lond. 1836.

† *Essai sur l'Anatomie Pathologique en général:* tome i. p. 79. Paris, 1816.

‡ 'Stokes: 'All the cases which recovered, and they were not a few, were cases of accidental phthisis.'—*MS. Notes of Lectures.*

4. The constitutional disorder soon subsides. This is important; the disease may commence with very acute symptoms, which is not unfavourable, provided they decline early.
5. One lung only affected; the right the most favourable.
6. To these conditions must be added the possibility of the patient being placed in the best hygienic conditions, giving up all unwholesome occupation, and leading an open-air life, with liberal diet, &c.

A concurrence of all of the above conditions is necessary to a favourable prognosis.

CHAPTER X.

ORDINARY PHTHISIS—THE FIRST STAGE — ITS HISTORY—SIGNS AND PROGNOSTICS.

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A DEPOSIT of tubercle in the lung with or without accompanying congestion of the lung tissue, is the local condition. This may consist of

Deposits of two kinds.

1. A few tubercles scattered throughout the lung, causing but little irritation; or

2. A deposit of aggregated tubercles, limited to one spot, generally the apex of one lung, but occasionally occupying the base. Around these there is generally found much congestion of the lung tissue, even before softening. The pleura is also generally thickened and adherent. The more grave symptoms, even in an early stage, have reference rather to constitutional than to local disorder, but irritation of the lung begins to develop itself early. To the emaciation and fever evidencing the blood disorder which was the causative agent of the tubercle formation, we have now superadded such symptoms of local origin as cough, dry and harassing, expectoration scanty, streaks of blood, or even profuse hæmoptysis, with local pains and dyspnœa. A more decided hectic, ending in profuse sweating, may be regarded as due rather to irritation of the lung than to the tubercle. The emaciation is more rapidly progressive than in the premonitory stage. Much disorder of the digestive canal may accompany these symptoms, and nausea, thirst, anorexia and diarrhœa harass the patient; but these are chiefly found in the acute form of the disease.

Symptoms not due to local disorder.

Gastric.

We have to examine with regard to their meaning both the signs and symptoms. The physical diagnosis is of primary importance, and we believe that it is possible to distinguish the two forms of infiltration of the lung, the scattered separate tubercles, and those disposed in groups.

Physical diagnosis; earliest signs.

In 80 cases of incipient phthisis observed with peculiar care, the following was found to be the relative frequency of occurrence of the physical signs:

EIGHTY CASES.	No of cases.
Dulness of percussion observed in	All
Deficiency of respiratory murmur	69
Bronchial voice	48
Rough inspiration	47
Expiration prolonged	47
Mobility of chest walls lessened	41
Flattening of chest walls	38
Tubular quality of respiration	32
Dry crepitation	17
Wavy inspiratory sound	15

It is not proposed here to enter on the physical causes of the alteration in the healthy chest sounds further than is necessary to illustrate their meaning.* Their relative diagnostic value is pretty nearly expressed in the above table. The whole group of signs taken collectively implies more or less infiltration of the lung tissue both with tubercle and inflammatory products. The greater the number of these which may be present in any one case, the more confirmed is the diagnosis. The following will be found useful:—

A few scattered tubercles.

1. Physical signs denoting a few small tubercles scattered through the lung.

a. Inspiration rough, dry, its intensity increased.

* The reader is referred to Fournet, and to Dr. Scott Alison's valuable work on the *Physical Examination of the Chest in Pulmonary Consumption.* Churchill, 1861.

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b. Expiration—taking its ordinary intensity as 2—intensity and duration may rise to 8.
Bronchophony commences in some rare cases.

2. *Physical signs denoting crude tubercles in groups.*

Tubercles in groups.

a. Pulmonary crumpling sound.
b. Dry crackling rhonchus.
c. Sonorous sibilant rhonchi (bronchial irritation).
d. Inspiration rough, dry—its intensity increased.
e. Expiration—intensity and duration increased and the quality blowing.
f. Slight bronchophony.
g. Diminished local fremitus.
h. Slight dulness, localised and distinct.
i. Heart's sounds transmitted.
j. In certain cases a subclavian murmur.

The relative prognostic value of the physical conditions resolves itself from the consideration of the form of disease which is likely to result from the varied nature of the deposit in the lung, and the consequent inflammatory products.

A few scattered tubercles many remain unchanged for years without softening, and if pulmonary irritation be absent, may cause few symptoms beyond those dependent on the disorder of nutrition to which they owe their origin, and this is of the two the more favourable condition, although these cases occasionally proceed through the stage of softening with unchecked rapidity, while fresh deposits take place either in the same or in the opposite lung. When they become chronic they pass into the forms of disease treated of as 'chronic first stage,' and 'chronic diffused tubercle,' and in certain cases the 'strumous deposit' is of this nature.

Tubercles in groups more dangerous.

The deposit of tubercles in groups is the more grave occurrence; it is recognised by the greater intensity of all the morbid sounds, as well as by their more exact localisation, and it is accompanied by more irritation of

the lung tissue than the scattered tubercles. The intense dulness is more due to condensation of the lung tissue from inflammatory products, than to tubercle itself.

Physical signs due chiefly to inflammatory products in the lung.

The pulmonary crumpling sound, crackling, and various râles, depend on this condition, as also a highly tubular form of respiration. These signs may be removed by local depletion and counter-irritation while the tubercle remains. On the whole, the chances of immediate softening occurring are greater in this form of deposit, and the prognosis must be accordingly.

Alterations in chest walls.

The value of physical signs dependent on alteration in the walls of the chest is doubtful, but deserves attention. Flattening and impaired mobility are probably due to altered atmospheric pressure caused by much solidification of the pulmonary tissue and to adhesions between the pulmonary and costal pleuræ at this spot. They would therefore appear to indicate a condition which has already attained somewhat of chronicity, and if signs of softening are absent, and the constitutional symptoms are subsiding, may be regarded as indications of a form of the disease primarily latent, and likely to advance slowly. These two signs are always present in retracted cavity and in tubercular cases which have undergone the curative changes of cretifaction.

Value and meaning of the sign.

The value of wavy inspiratory sound has been variously estimated by different authorities, and even its interpretation remains obscure. Stokes* says, 'It indicates the first stage of tubercular irritation, and may be removed by local treatment. As a diagnostic, however, it has no value unless when it is local, and occurring in a case where tubercle has been already recognised, when it becomes the "avant-courier" of more unequivocal signs.' 'Il est probable qu'elle dépend encore de l'ampliation difficile incomplète, des

Stokes.

Barth, Roget.

* *A Treatise on the Diagnosis and Treatment of Diseases of the Chest.* Dublin, 1837. p. 397.

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cellules pulmonaires, et de la gêne que les adhérences apportent à la libre expansion du poumon.' *

Alison.

Dr. Alison † thinks it 'due to the presence of an undue resistance to the inpassing columns of air,' and made up of the friction sounds of the ultimate and preultimate bronchial tubules.' He does not, however, attach any prognostic value to it. The best description of this sign and its meaning is to be found in a work by my late colleague.‡ He considers it an uncertain sound, and attributes it to an exudation in the lung less albuminous than tubercle, less fibrinous than the usual product of common inflammation about the walls of the ultimate tubes, and in the pulmonary structure, impairing the elasticity of the part which may afterwards become a nidus for tubercle, or it may be due to pleuritic adhesion. His experience corroborates the tables given as to its being more common at the left side.

Thompson.

Its permanence and combination with other signs indicate phthisis in the first stage, and it is associated with a very slow form of that affection. An undue proportion of such cases have hæmoptysis (one fifth), and phthisis advancing with this sign is usually very rapid.

Ephemeral form.

An ephemeral form of the wavy inspiratory sound is met with in hysterical females; it is not permanent on cough, and is only occasionally present.

True wavy sound never single.

The persistent, true, wavy, or interrupted inspiratory sound, to which a certain value may unhesitatingly be attached, is never single.

Description of.

It is not purely vesicular respiration broken or interrupted, but consists in a union of this condition with a rough, dry, harsh tone, occasionally even with tubular sounds. The expiration is commonly prolonged, but not waved; § the voice

* *Traité d'Auscultation.* Barth et Roget, Paris. p. 70.

† Op. cit. supra.

‡ *Clinical Lectures on Pulmonary Consumption,* by the late Theo. Thompson, M.D.; with additional Lectures by his son, E. Symes Thompson, M.D. London, 1863. p. 129.

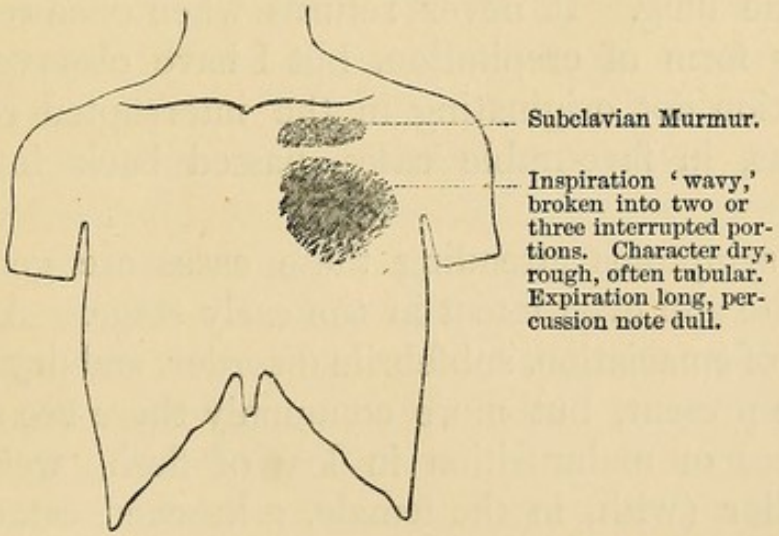
§ I have met with a few instances of marked wavy *expiration.*

rarely ever resonant at the spot; some dulness and flattening may or may not be perceptible. Its value as a sign of slow phthisis will be found only in cases where it is limited to a small portion of the lung, commonly high up, about the second or third intercostal interspace. Pain is often present, and tenderness on pressure; and when it is on the left side, a subclavian murmur with the systole is not uncommon.

This form may remain for years and then pass into humid crepitus, or it may disappear, in which case the other signs of deposit remain or are intensified. Its disappearance in either a crepitus or in these roughened sounds is a bad prognostic, the progress to softening changes usually becoming rapid. Regarding its origin, I conceive that it must chiefly be referred to pleural * thickening and slight adhesions associated with a deposit of crude tubercle near the surface of the lung.

Origin of.

As a prognostic it is highly valuable, some of the most prolonged cases of phthisis in the first stage being marked with this stamp. Its permanence is a sign of the deposit remaining without softening, its disappearance into crepitation is indicative of rapid second stage.



The ordinary seat of wavy inspiratory sound, with the associated physical signs.

* I have verified its existence in cases of acute pleurisy undergoing absorption, where its position will often be observed at a spot recently the seat of dulness, and absent respiration, but beginning to clear up.

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The previous figure indicates the most common position of this wavy inspiration with the concomitant signs which give it value.

Its value.

In assigning it a value, it may be fairly called a transition sound, occupying a position between feeble or rough respiration and dry crackle; and as its replacement by crepitation indicates an advance in the stage of disease the conditions which originate it may almost be said to form a barrier, partly pleural and partly pulmonary, to the destructive changes which characterise softening tubercle. It is found frequently on the edge, as it were, of softening tubercle, and occupying the portion of lung which is next to undergo that process. Instances of this will be mentioned in the chapter on the second stage.

Frequent in rheumatic diathesis.

Wavy respiration is undoubtedly found occasionally in the rheumatic constitution, although not in sufficiently numerous instances to justify our assigning its origin to this diathesis.

May be followed by softening and by increased deposit.

Its cessation is occasionally followed by not only a softening at the part which gave the sound, but by a gradually increasing deposit throughout the whole of the same lung. It never returns when once replaced by any form of crepitation, but I have observed that crepitation not originating in the interrupted respiration has, in favourable cases, passed back into the wavy.

Symptoms attending.

The symptoms attending these cases are generally moderate and even latent in the early stage. A slight degree of emaciation, subfebrile disorder, and dry cough may be present, but more commonly there are simply evidences of malnutrition in loss of flesh, weakness, and pallor (with, in the female, a lessened catamenial discharge), and without any fever. Slight cough and pain (probably pleural) are ordinarily present. Many cases attract no attention till a hæmoptysis occurs, a symptom common in an unusual proportion. There

Hæmoptysis common.

is generally a rally in health after this, and remedies answer their purpose. Local depletion may remove the sign altogether, and the patient's health improves up to a certain point, but never regains the former standard; and if at the age of growth or early adult life, development is arrested. An indefinite period may elapse before softening or extension of disease occurs, and these form, as has been shown, a very chronic class of cases, to which a prognosis of slowness may be safely attached.

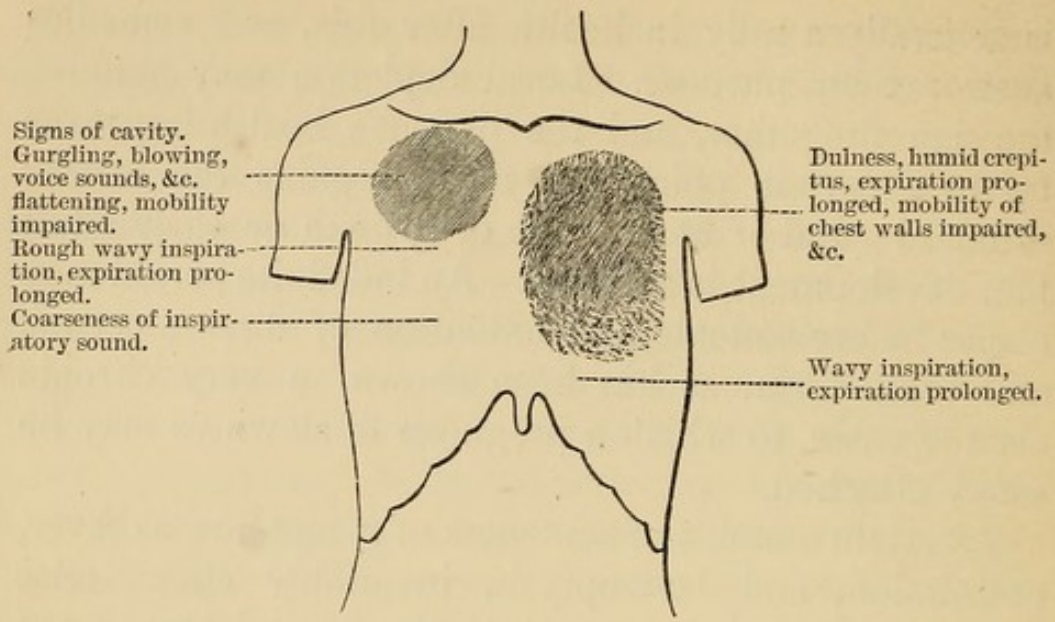
May pass into humid sounds with fever or without.

A certain amount of acuteness of symptoms, as fever, emaciation, and hæmoptysis, invariably characterise the passage of these cases into the second stage; yet there are instances in which they imperceptibly glide into the more advanced aspects of the disease, till the secondary affection, intercurrent attacks of pneumonia, diarrhœa, and laryngeal irritation assume prominence and hasten the fatal issue. Viewed comparatively, of these two modes of termination the former appears to be most common, yet the possibility of the latter is not to be lost sight of, and a too hasty judgment should never be passed on a case presenting acute symptoms at the time of transition, for after some sharp fever accompanied by the signs of softening, it may again assume the chronic indolent form, and from a slow first, enter on an equally slow second stage.

Value of wavy inspiration associated with second and third stages.

It still remains to consider the value of wavy inspiratory sound when found in conjunction with humid crepitation and the other physical signs of softening tubercle, or with cavity in the lung. In such cases, its position is almost invariably below that of the more advanced signs of the disease. The following figure shows its ordinary localisation. The right side is supposed to present the phenomena of a cavity in the apex with this sign beneath it, and the left the phenomena of softening or second stage.

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The right side shows the position of wavy inspiratory sound with relation to a circumscribed cavity. The left the same sign with relation to a softening deposit, making slow progress.

Favourable conditions.

In such instances it will be found that the progress of the case is slow, provided that the physical signs below those of the more advanced stage have been present for some time, and are not merely results of the continuous extension of the deposit.

These physical conditions are therefore favourable indications for chronicity, and to whatever cause we may assign the 'wavy' or 'interrupted inspiration,' they act in certain instances as a temporary barrier to the advance of local disease. For this reason, among others, we are inclined to associate it with pleural thickening, combined with inflammatory or other products in the lung which are not very susceptible of destructive changes.

Relative duration of these cases.

In estimating the relative duration of cases with this peculiar sign as compared with others in the first stage which have already attained a chronicity of eighteen months, but in which it is absent, we find that they do not stand as high as the latter. The observed duration of 173 cases gave an average of 26·60 months to

each case, whereas the observed duration of 194 chronic first stage cases gave an average of 49·48 months to each. The average observed duration to be assigned to wavy inspiration cases therefore stands between ordinary phthisis and chronic first stage, thus:—

Average observed duration of	ordinary phthisis .	15·22
„ „	wavy inspiration .	26·60
„ „	chronic first . .	49·48

Reason why it stands low.

The reason that this sign of slow phthisis stands so low in our table,* is to be found in the fact already noticed, that cases of advancing phthisis with this sign break up rapidly. It is therefore a doubtful element in prognosis, and requires a most careful examination into the history of our cases, in order that its true value may be estimated. Chronic cases, without fever presenting it, are likely to be very slow: phthisis with a history of continuity in the symptoms, with fever, frequent hæmoptysis, and pain, and marked by wavy inspiration, is generally rapid.

Wavy in first stage.

Table showing the ages and sex in which wavy inspiration occurred, along with other signs and symptoms of the first stage of phthisis.

Age of Patient	Males	Females	Total
10	3	3	6
15	3	15	18
20	20	17	37
25	20	14	34
30	12	39	51
35	13	10	23
40	7	3	10
45	5	2	7
50	1	2	3
Total .	84	105	189

* See Table, p. 77.

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Age.

More females than males.

From this table it appears that the age at which this sign is most commonly found is from twenty to thirty-five; that none of the patients were under ten years of age, and none over fifty.* More females than males presented it, and as the hysterical element was carefully sifted out of these cases, we may infer that it is more common in females.

Duration.

Duration of disease up to the time the patient was lost sight of in 173 *cases.*

Duration	No. of cases	Duration	No. of cases
6 months . . .	30	7 years . . .	1
1 year . . .	29	8 „ . . .	2
2 years . . .	30	9 „ . . .	3
3 „ . . .	17	10 „ . . .	0
4 „ . . .	8	11 „ . . .	1
5 „ . . .	6	12 „ . . .	1
6 „ . . .	2	Indefinite long periods .	43
Total			173

The average duration of the cases with this physical sign is 26·60 months, deduced from the above table. The following table shows the state on leaving the hospital:

Better on leaving	70
Worse „	28
Stationary	75
	173

Associated with second and third stages

This sign was also found associated with the second and third stages of phthisis, i.e. with softening or cavity in other parts of the lung, in sixty cases which I have thrown into a tabular form.

* Maclachlan, however, gives this as a sign occasionally observed in senile phthisis (op. cit. supra).

Table showing the ages, sex, and duration of 60 cases in which wavy inspiration was observed to be associated with the 2nd and 3rd stages of phthisis.

Age	Males. No. of cases	Females. No. of cases	Total
20	8	6	14
25	12	8	20
30	5	2	7
35	6	3	9
40	3	2	5
45	2	0	2
50	0	1	1
55	2	0	2
Totals	38	22	60

The following was the observed duration of the cases up to the time of leaving the hospital.

3	cases had lasted for	6	months.
12	„ „	1	year.
15	„ „	2	years.
7	„ „	3	„
4	„ „	4	„
3	„ „	5	„
1	„ „	9	„
15	„ „	indefinite long periods.	
Total 60			

Of these thirty-eight were associated with the *second* stage of phthisis, and twenty-two with the *third* stage.

State on leaving hospital.

Better	19
Worse (two dead)	17
Stationary	24
Total	60

This sign is therefore not only often found as a characteristic of slow first stage, but when associated with signs of more advanced disease in the lung, may even then be accepted as indicative of a tendency to prolongation and chronicity.

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Left more frequently the seat.

In 238 cases the localisation of this sign was ascertained to be—

On the left side in	166 cases
„ right „	56 „
On both sides in	16 „
Total . .	238

In only 20 instances out of 238 was it found that other affections were or had been present. They were as follows, and do not possess much value:

Associated affections.

Morbus cordis	in 6 cases.
Tænia	„ 2 „
Pleurisy	„ 3 „
Struma	„ 2 „
Rheumatism	„ 3 „
Anæmic murmur	„ 3 „
Ague	„ 1 case.
Total . .	20

Physical signs arising from irritation of lung of the highest value.

Viewed as a whole, those physical signs are of highest value which arise from the irritation of lung tissue, and may be called inflammatory. 'Induration of tissue rather than the tubercle, is the cause of the physical signs in the first stage;' * and we may add that it is also the key to the prognosis. If we could deduct the inflammatory element from the local disorder, the residual tubercular deposit might be tolerated for years; and whether such deposit softens from an inherent tendency to decay, and in so softening irritates the lung, or from inflammatory actions induced in the surrounding tissues, it is certain that the degree of the lung irritation is the measure in direct ratio of the destructive rapidity of the case. It is in this light alone that physical signs become serviceable in prognosis, and they are never to be regarded as an exact measure of the quantity of tubercular deposit, but rather of this

* Walshe. Ed. 3rd. 1860.

—plus the products of inflammation in the various structures of the lung.*

Localisation of the deposit.

The localisation of the deposit possesses much interest in a prognostic point of view. The relative frequency of tubercle commencing on the right and left sides has been calculated, but to little purpose. Laennec thinks the right lung more frequently affected, Louis the left, Cotton the left.† Softening begins more frequently on the left (Cotton and Walshe), and my own observations confirm this, but for the first stage this consideration has slight prognostic value.‡

Right and left.

The part of lung more important.

Somewhat more important is the part of the lung invaded. In the vast majority of cases tubercle is first deposited in one or other apex. It begins in the base much more rarely; in two cases only in the thousand analysed by Dr. Cotton, and 'once in sixty or eighty cases' by Walshe. I have found sixty-four cases in a total of 4,530, with the physical signs most marked, from the commencement, at the base.

Signs at base.

Analysis of sixty-four cases in which the physical signs were at the base of the lung. Of these fifty were males, and fourteen were females.

In the first stage were 3 cases.
second „ 59 „
third „ 2 „
The apices of the lungs were clear in 32 cases.
Signs of incipient disease in apex 32 „

* The same remark applies to the vital capacity of the chest, as ascertained in Hutchinson's experiments with the spirometer. The average reduction of respiratory space in the first stage of phthisis was found to be 30 per cent.

† Softening generally begins at the posterior part of the apex.

‡ Stokes has seen more recoveries when the disease was confined to the right lung.

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The duration of these cases up to the time when they were last seen was as follows:—

Duration	No. of cases	Duration	No. of cases
6 months	6	4 years	2
1 year	15	5 „	1
1½ years	7	6 „	2
2 „	5	10 „	2
2½ „	9	Chronic indefinite periods	13
3 „	2		
Total	64		

State on leaving hospital.

Better	19
Stationary	14
Worse	20
Once seen	11
Total	64

I infer from these cases that a primary development of tubercle in the base of the lung tends to chronicity. The average duration of 'ordinary' phthisis *while under observation* was found to be 15·22 months, while that of disease at the base of the lung is 26·35 months.

As the ages may prove interesting I subjoin them.

Age and sex of cases of disease commencing at the base of the lung.

Age	Males—No. of	Females—No. of
20 years	2	2
25 „	3	3
30 „	12	2
35 „	5	1
40 „	8	1
45 „	11	3
50 „	3	2
55 „	4	0
61 „	1	0
64 „	1	0
Totals	50	14

The comparative infrequency of tubercle commencing at the base of the lung in females is worthy of remark. The age at which such exceptional instances occur most commonly would appear to be from thirty to fifty-five; there were none under twenty. This may be accounted for by the abstraction from this table of the cases described as 'strumous phthisis,' in 300 of which forty-six presented the chief physical signs at the base of the lung, most of them being under the age of twenty. In this latter form I have also observed that the cases were ordinarily of a prolonged character, so that the general truth may be assumed, that tubercle beginning at the base of the lung is commonly slow in progress. And this is to be regarded as only one illustration of a law elsewhere referred to, *that in proportion as phthisis deviates from its ordinary and well-known course, in so much does it tend to be prolonged beyond its average duration.**

Signs at base rare in females.

Common at age advanced.

Law affecting duration.

The value of symptoms as prognostics has shortly to be considered.

Value of symptoms as prognostics.

Hæmoptysis is often one of the earliest, always the most alarming to the patient. It occurs in about 63

Hæmoptysis.

* There is a low form of partial pneumonia, generally attacking and limited to one base, beginning with insidious symptoms of a lowered state of health, and remaining persistently for some weeks or even months, which is very apt to be mistaken for an attack of tubercle. It occurs chiefly in men about middle life, engaged in anxious occupations, as merchants, medical men, &c., who, neglecting the early symptoms of disordered health, continue at the wheel in spite of feelings of great muscular weakness, disorder of digestion, and a subfebrile state. The signs are those of pleuro-pneumonia of one base (the right perhaps more commonly). The evidence of solidification, more or less perfect, will be found in dulness, tubular breath sounds, &c., which are succeeded by a subcrepitant rhonchus, slow to disappear or resolve. There is slight cough, dyspnœa, but not rusty sputa. The general health is much disordered, and a pyrexial state always prevails. Though very slow, these cases will get well if treated by perfect rest, change of air, liberal diet, and a fair allowance of stimulants, regulation of the secretions, and counter-irritation repeated over the affected part. I have witnessed several complete recoveries, the physical signs entirely disappearing, and the health being restored.

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per cent. of all cases of phthisis, and is more frequent as 3 to 1 in the first stage.* It is due at this period to extreme congestion of the pulmonary vessels, arising from the local inflammatory action accompanying the deposit of tubercle, and from pressure on the pulmonary veins. It is analogous to pulmonary apoplexy. It is rare in early life, more common from twenty to forty. Its quantity may vary from a streak to a profuse loss to be measured by cupfuls. It cannot be accounted for by breach of surface in the lung or vessels, such as occurs in the second or third stages of phthisis, but is plainly the result of an intense congestion. Viewed in this light it is undoubtedly a relief to the local disorder, and this result is certainly witnessed in the later stages of phthisis, when we often see the patient relieved from distressing cough, dyspnœa, and pain, and the fever subside after a moderate hæmoptysis. Our present question is, does it equally relieve the lung in the stage of deposit? We believe that this can be answered affirmatively, and the opinion is confirmed by practice and authorised by theory.† The amount of the hæmoptysis involves other considerations. If quantity is to be considered as evidence of the degree of congestion, cases of profuse loss should turn out unfavourably, unless indeed the relief from the depletion should more than counterbalance the ill effects of the great intensity of the vascular turgescence which preceded and gave rise to it. I have observed 351 cases of profuse hæmoptysis, of which 204, or more than one half, occurred in the first three months of the illness, so that this symptom is by no means rare at the beginning of phthisis. In twenty-eight instances it took place between the third and sixth

Its cause.

Hæmoptysis a relief.

Influence of quantity.

Profuse hæmoptysis.

Its influence.

* 1st Medical Report of Hospital for Consumption. 1849.

† See chapter on Acute Phthisis, where it is shown that hæmoptysis is more rare in that form of the disease. See also chapter on Hæmoptysis.

month, and in thirty-eight between six months and one year. In tracing the duration of all cases of profuse hæmoptysis, and in all stages, the average of the whole was 30·35 months while under observation.

But it was observed that although the average duration of the whole case was about fifteen months above that of ordinary continuous phthisis, the first stage was comparatively short, in other words, that the softening occurred early. Out of 351 cases only forty-five had remained in the first stage when examined, 142 having undergone softening, while 164 had cavities. If, then, this form of the disease is ultimately rather prolonged, the retardation occurs in the second and third, and not in the first, stages. It would thus appear that considerable congestion of the lung is unfavourable to the quiescence of the tubercle deposited, which is rendered more prone to undergo destructive changes by this condition, and that the vascular turgescence of the part, although doubtless relieved by the loss of blood, has not been sufficiently so to counterbalance the ill effects of the congestion. We may presume that fibrinous products remain, and a condition of the surrounding lung analogous to that caused by inflammation, which adds to the permanent mischief undergone by the organ, and which doubtless is readily involved in the softening, changes afterwards to take place in the tubercle.

Softening occurs early.

Fibrinous products remain.

For these reasons an early profuse hæmoptysis is to be regarded as a bad prognostic, the softening being likely to take place early, and the remission in the progress of the disease to occur only at a period when already much structural mischief has taken place.* The

Early profuse hæmoptysis a bad prognostic for the duration of the first stage.

* The prognostics to be derived from slight repeated hæmoptysis are on the other hand not favourable, this being the commencement of the ordinary form of phthisis. Again, the most acute form of tubercular disease in the lung is often characterised by the absence of hæmoptysis. On the whole, I place little reliance on this symptom or its absence as a prognostic, although I have felt bound to give the reader the result of my investigations.

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tendency to its repetition is also to be remembered. This occurred in 151 instances out of 351 cases. In every instance of fatal hæmoptysis which I have witnessed there had been previous attacks.

Tendency to repetition.

From the nature of the cough and matters expectorated there is little to gather for prognostic purposes in this stage.

Fever.

The nature and intensity of the fever has been already dwelt on in the preceding chapter, and need not be repeated. Uniformly high pulse, one or even two exacerbations of fever in the twelve hours ; a hot skin ; chills, frequent and followed by partial sweats, are of evil import unless they steadily subside after a maximum of intensity.

Gastric symptoms.

The same may be said of gastric symptoms of severity, thirst, nausea, anorexia, red tongue, vomiting, diarrhœa. The febrile condition united to these features of disease constitutes acute phthisis, and their continuity means death.

Rapid waste.

Rapid waste of flesh deserves notice. Sudden great alterations in weight are perilous, and in phthisis they generally occur in persons who have been in rather full flesh. The most rapid reduction I have witnessed (and verified) took place in three months, from 12 st. $5\frac{1}{4}$ lbs. to 8 st. $5\frac{1}{4}$ lbs., a loss of 4 st.! I have carefully examined twenty-eight such cases.

	No. of cases	1 stone	1½ stone	2 stone	2½ stone	3 stone	4 stone
In 5 weeks	1 had lost	—	—	1			
„ 2 months	4 „ respectively	—	1	2	—	1	
„ 3 „	7 „ „	1	2	1	—	1	1
„ 4 „	3 „ „	—	—	2	—	1	
„ 6 „	3 „ „	—	1	1	1		
„ 8 „	1 „ „	—	—	—	—	1	
„ 9 „	1 „ „	—	1				
„ 10 „	3 „ „	—	1	1	1		
„ 12 „	5 „ „	1	—	1	—	2	1
Total cases . 28							

The lowest weight when in health of any of these individuals was 10 st. He lost in five weeks $1\frac{1}{2}$ st. The rest averaged 12 st., and one was 14 st. 10 lbs., who lost 3 st. in eight months; another whose healthy weight had been 13 st. was reduced to 10 st. in three months. Twenty out of the twenty-eight examined were between twenty-five and thirty-five years of age. Six were in the first stage, ten in the second, and twelve in the third stage of phthisis when examined, showing that the period of deposit was exceedingly short, and the softening and destructive processes accelerated. The proposition may perhaps be laid down, that rapid and considerable emaciation in the early stage of phthisis is indicative of local changes in the lung of corresponding speed, and that persons of full flesh becoming tuberculous are more likely to have the acute than the latent or insidious form of the disease. The converse of this proposition when applied to the later stages of phthisis is not always true, namely, that in cases where flesh is regained the tubercular disease in the lung improves *pari passu*. It may do so, but more commonly the lung affection remains stationary while the nutrition of the body increases. It may further be remarked that the greatest and most rapid reduction of weight took place in males.

Persons in full flesh likely to have a rapid form of phthisis.

Males most subject to rapid reduction of weight.

The following propositions comprise a summary of the elements of prognosis in a given case of phthisis in the first stage :—

Summary of the elements of prognosis in the first stage.

1. Of the two kinds of deposit, scattered and aggregated tubercles, the latter is the more serious.

2. The physical condition of the lung is never to be regarded singly and without reference to the symptoms.

3. The physical signs resolve themselves into those indicative of simple deposit, and those arising from irritation of the lung.

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4. Moderate dulness of the percussion note, and alterations in the intensity and duration of the respiratory murmurs, but chiefly of the expiration, have reference more especially to the tubercle deposited.

5. A tubular quality of the respiration, dry crepitation and crackling, with sibilant and other rhonchi, combined with a more intense dulness of the percussion note, may be referred to the greater condensation of the lung from inflammatory products, and to irritation of the minutest air vesicles. This class of signs, if persistent, is the more grave. In certain instances they are capable of removal by local depletion, while the former are permanent.

6. Wavy inspiration, if a single sign, is of doubtful import; but if long persistent, generally means slow phthisis.

7. Wavy inspiration, if accompanied by the signs referable to condensation of the lung tissue from inflammatory products, is indicative of rapid phthisis.

8. Alterations in the chest walls in the first stage indicate an already long-existent cause, and are not unfavourable prognostics for duration.

9. A deposit in the apex (the ordinary form) is more likely to undergo rapid changes than a similar condition at the base of the lung.

10. Deposits at the base occur most frequently in children (the strumous form), and in adults about middle age. This form is rare in females, and generally means slow phthisis.

11. Hæmoptysis in the first stage indicates congestion of the lung. When profuse, its import is bad, as implying a likelihood of the rapid passage of the tubercle into the second stage.

12. Cases of profuse hæmoptysis in the first stage may afterwards become chronic, and the average duration of cases so commencing is above that of ordinary phthisis.

13. Profuse hæmoptysis is likely to be repeated in the later stages, and so forms an element of danger.

14. The intensity of the fever and absence of complete remissions, with gastric symptoms of severity, taken together, indicate rapid phthisis. The extent of physical signs is here of less moment than the symptoms.

15. Rapid waste of flesh, especially when occurring in persons rather above the average weight, is a bad prognostic; males are most subject to rapid reduction of weight.

The following cases illustrate the marks on wavy inspiratory sound:—

Case.

Persistent physical signs for 7 years. General health good.

Sarah R. æt. 15. Dark hair and eyes, well formed, catamenia established some months, colour good, in good flesh, looks rather plump. This girl has been under my care for seven years. In 1856 she presented the physical signs of *dulness, prolonged expiration, and rough inspiratory murmur under the clavicle, with much increase of vocal resonance in the supraspinous fossa on the right side,* and had cough and expectoration with much loss of flesh. Her appetite and digestion were excellent, and she was well nourished and carefully attended to. There have been several cases of phthisis on the mother's side, and one sister died of the disease under my care. She now, July 1863 (*seven years later*), presents the physical signs of *very markedly wavy inspiration, persistent on cough, and great roughness of the inspiratory tone on the right side, with the same signs* (*less pronounced but evident*) *on the left. The percussion note slightly dull on both sides.* She has some cough but no expectoration, no dyspnœa, and looks in all respects in perfect health. She took cod liver oil for five years, ℥ij. three times a day.

Persistent first stage for 4 years, passing into second stage; present duration 7 years.

A. T. A pale anemic girl, æt. 17, without predisposition to phthisis, was examined by me in June 1858. She was out of flesh but of spare habit; no cough, expectoration, or fever. Catamenia irregular; once in two months; always scanty. Phy. signs:—*Chest rather flat, movements equal, fair, no comparative dulness but general tone rather flat.*

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Slightly wavy inspiration which vanishes on cough in left subclavicular space. She was ordered iron, horse exercise, hip baths, and full meat diet. In May 1859, *marked wavy inspiration persistent after cough, from clavicle to 3rd rib left*; general health improved; catamenia still absent. Went to Eaux Bonnes in France at my request. In August same year examined on her return. Ctma. still absent; general health good; has gained flesh. Phy. signs: *Rough dry inspiration still observable in left apex, the wavy character has ceased.* December 1859, 'Cough without fever' is the report. In March 1860 she had caught cold, and had severe pain in left side with much hectic. Phy. signs: *dulness with humid crepitation over nearly the whole of the left side, extending almost to the base posteriorly.* She recovered from this almost fatal illness, and in the winter went to Algiers. In May 1861 she came back to England, had gained 5 lb. in weight and much in strength. She has had a liberal diet with wine, horse exercise, cough often troublesome, expectoration very slight, ʒij. in day. Catamenia still absent. Has taken oil and steel constantly. Phy. signs: *Slight dulness, impaired mobility, deficient respiration chiefly about the base, occasional subcrepitant râle left side.* In 1861 she went to Madeira for the winter, where Dr. Lund reports: 'Miss T. arrived here in a very favourable state, tolerably stout, fresh coloured, pulse 72; catamenia returned for two months. At the end of December the pulse began to rise, the expectoration was white and flocculent, the cough became intractable. *Subcrepitant râle well marked at base of left lung.* In March large râle in *left* with increase of expectoration.' In June 1862 I examined her, and found *dulness, coarse dry crepitation under the clavicle, in the supraspinous fossa, and by the side of the scapula nearly to the base. The respiration is tubular opposite the middle of the scapula near to the spine, the axillary base clear, slight flattening of the chest walls in the subclavicular space.* In October 1862 there was *rather fine humid crepitus extending below the scapula to the base*; manifest increase of cough, no fever, ctma. again absent three months. To go to Ventnor for the winter. She got on pretty well here, but the cough has become more constant with increased expectoration. Phy. signs, May

1865, are *crackling crepitation over the whole posterior aspect of the lung, and to about the 4th rib anteriorly, also in axilla.* There is decided improvement in strength, and she is in fair flesh. No fever, app. good, has not taken oil lately; she is able to enjoy society and moves about a good deal in summer. Throughout the whole period from 1858 she has taken oil and iron pretty regularly, and counter-irritation has been freely used over the side. It is to be noted in this instructive case, that the disease was not hereditary, that the earliest symptoms were those of anæmia, the earliest sign the wavy inspiration, and that but for the intervention of the acute attack in 1860 she might have remained in her former state for years. The gradual alteration in the physical signs is worthy of note. There has never been hæmoptysis.

7 years.

E. H. æt. 27, shopwoman. Brother and cousins d. of pht. Hæmopty. seven years ago when O. P. at this hospital, also two years ago, and occasionally ever since. Cough seven years, slight but constant. Spare and loses flesh lately, but not much. Chills and slight sweats. Ctma. reg. but scanty. App. poor, bowels rather loose, tenderness and pain in r. subclav. *blowing resp. and vocal res. increased apex right, wavy insp. left subclav.* Improved much on oil.

Wavy R. Rheumatic fever.

J. B. æt. 32, tailor. No predisp. to pht., out of health six or seven years, has habitual sl. morning cough, no expectoration, much nausea, acidity; is a good deal out of flesh and looks much out of health; *marked wavy respn. dry whiffing left subclav.*; *pains in left side.* By counter-irritation and saline treatment he lost his cough. In the winter he had rheumatic fever. Sign persistent after recovery.

Wavy.

C. C. æt 19, f. No pred. to pht., hæmopt. a cupful six years ago; was In-Patient twice four years ago; habitual cough, generally slight, but worse lately. Is now losing flesh and strength, but has done so on former occasions with recovery. *Rough dry blowing insp. and exp. right subclav. Rough wavy inspir. left.* Has taken much oil. Discharged much improved in health three months later.

Chronic first 6 years.

Advancing phthisis.

A. W. æt. 21, dressmaker. Mother and sister died of pht. Has had cough for years, no hæmopty., much hectic, profuse expect., t. coated, diarrhœa, thirst. *Diminished mob. flattg. bronchophony, humid crep. at apex, wavy insp. very*

Wavy insp.

Death.

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marked below this to the base right, rough wavy insp. subclav. left. Rapid increase of all symptoms, and death three months later.

Wavy replaced by other signs of stage of deposit.

E. K. æt. 36, compositor. Mother and brothers d. of pht.; dry cough and dyspnœa four months; slight expect., loses flesh and strength, no fever, digestion impaired; *movements good, dulness and dry wavy resp., opp. 4th rib left, dulness and bronchophony, apex right.* Improved much on quinine. Left town and took work in Bedfordshire; returned three years later and was examined. *The sounds were rough and blowing, resp. at the left, the waviness had disappeared.* His health was again bad, but he left London three months later much improved; duration $4\frac{1}{2}$ years.

Wavy replaced by crepitus; progress to cavities rapid.

J. R. æt. 25, clerk. Mother, uncle, and aunt d. of pht.; slight cough for some years, no hæmopty., expect. lately more abundant, thick, is a good deal wasted, had sweats some weeks ago, no diarrh., app. fair, movements good, percussion even; *slightly wavy insp. and prolonged exp. left.* Ordered oil, iodine solut. to the left, three glasses of wine in day. In January *the wavy sound was replaced by humid crepitus, and in July there was a cavity in each lung.*

Limited cavity in one lung; wavy in other; fair health.

C. G. æt. 21, f. Aunt d. of pht.; complains of weakness for one year; cough severe in autumn, again in spring, absent in summer; hæmopty. slight, frequent; no expect. for some time past, embonpoint good but has lost, app. fair, b. reg., no fever; has taken oil one year; *gurgling and cavernous blowing, &c., for some inches subclav. left (clear below this), dry rough wavy resp., apex right,* weighs $8{\cdot}1\frac{1}{4}$; went to Hastings, gained 12 lb., in six weeks. Seen one year later in fair health and flesh, scarcely any cough; still taking oil.

11 years; wavy in front, and softening at the back of left lung; rapidly worse.

G. M. æt. 35, carpenter. No predisp. hæmopty. mod. eleven years ago, five years ago, and last week; cough habitual, remains spare but not much wasted, no present fever, digestion good. *D. humid crepitus, extensive over front right: wavy inspir. and rough character of r. subcla. with humid crep. in the suprasp. fossa left*; has taken much oil; repeated hæmoptysis occurred, and he left much worse.

First stage 7 years; replaced by

W. R. æt. 30, painter. No predisp., has been an Out-P. here for seven years, he has habitual cough, slight dark expect., looks out of health but never loses flesh to any great

extent. Phy. signs: *Dulness, dry, tubular, wavy, inspi. and exp. prolonged both apices.* In the eighth year of his attendance the wavy sound on the left was replaced by humid crepitus, but he rallied from this after a considerable reduction of strength, and his state again became chronic.

moist sounds in the 8th year.

CHAPTER XI.

CHRONIC FIRST STAGE: THE DEPOSIT TOLERATED.

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Conditions of this state.

THE conditions of this form are, that the deposit in the lung remains unchanged, and is tolerated for an indefinite time, the tubercle not causing any local irritation of importance, and the constitutional symptoms subsiding; also, that no further deposit takes place. The patient, in such a state, has undergone an attack of tubercle, which has neither been absorbed nor altered in its chemical composition, nor has undergone softening changes.

Two varieties.

There are two varieties to be observed.

1. Neither local nor systemic symptoms.

1. In which the patient is as nearly as possible in his original state of health, with a tolerated deposit in the lung, there being neither systemic disorder nor symptoms of local disease, as cough, expectoration, dyspnœa; but only generally a lowered state of vital powers, which indicates rather an illness undergone than present disease. The physical signs of deposit in the lung are permanent.

2. Slight irritation of lung with recurrent febrile attacks.

2. The second variety is rather one of long continued slight irritative disease in the lung; which is reflected in the system, by reduced strength and subfebrile attacks, and is observable as lung disease by cough, expectoration, dyspnœa, &c. The physical state of the lung shows phthisis (1), but indicates no advance or progressive destructive changes. There may be, and commonly is, a successive slight gradual increase in the amount of the morbid deposit, showing a continuance of the con-

stitutional dyscrasis. This occurs during accesses of illness, with febrile disorder.

Both these forms may end in softening and its concomitant symptoms, and such is the result in a very large majority of the cases; but it is possible for the patient to die of some non-tubercular disease.

The first variety. The first variety constitutes what has often been described as 'latent phthisis.' It may either commence silently with the symptoms of emaciation, slowly progressive, and occasional febrile attacks, and digestion much disturbed; or it may attack with symptoms of great severity, wasting, hectic, hæmoptysis, irritative cough, and all the physical signs of a deposit, generally in the apex of the lung; and, after proceeding so far, every active disorder of health may cease, and the patient regain vigour and flesh up to a certain point, and lose his cough altogether. An occasional and rare expectoration, chiefly of mucous matters, may mark a tendency to irritation of the lung. Such individuals are capable of performing most of the duties of active life, and are often unconscious of any ailment for successive years. They are to be met with in the pulpit, and complain only of the after fatigue of prolonged duties; on the Exchange, where only extra hours, extra anxiety and excitement seem to tell on them more than on other men; in our own active profession, eager in the fight for fame and position, and only remembering a long-passed symptom of suspicious omen, when some overstrain has been applied to the machine; on the mountain side in Scotland and Switzerland, where they are occasionally pulled up by dyspnœa or hæmoptysis, and the cause has to be looked for in a forgotten ailment, dating years back. Sometimes they run on to old age, when at sixty-five or seventy the lung exhibits signs of irritation once more, and a progressive emaciation is the first sign of mischief, to be followed by dyspnœa and cough. The more

May commence silently.

Or with acute symptoms which subside.

Vital powers good.

May live to old age, when disease may become active.

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fortunate in wordly means, who can select their homes where they like, and have no ties to country or climate, are to be found on the Nile in boats, enjoying that dry and tranquil climate; in Italy, among her ruins and galleries; in Madeira, Africa, and Australia; some in the far Pacific Islands; others in Canada and Norway; in the Hebrides and in India; in the latest fashionable resorts of Mentone or Arcachon, or wherever enterprise has undertaken to establish a sanitary home with agreeable surroundings; on the long voyages to the Antipodes, and in our splendid steamers on the Mediterranean. And yet, wherever they are met with, they are sure to be in the right place, or on the way to it, and they worship an imaginary specific climate, which is to surpass the last forsaken, and reinstate the valetudinarian traveller. Withal, there is a consciousness that they are never quite well, and that the enemy has one foot in the citadel. Yet, with the invigorated nervous system, the improved digestion and nutrition which such changes and exercises imply, they are among the most agreeable of our travellers; and although conscious of a flaw in the vital machine, this 'worn feeling has peopled many a page' with rare narratives of scenery and adventures in every remote and interesting corner of the globe. They are the condemned of the auscultators, having received a verdict from a fashionable physician fifteen or twenty years ago, and set to work like wise men to convert his faithful warning into a falsehood. One who seemed in perfect health and vigour, is a prosperous trader in a remote part of Africa, where he had gone after an hæmoptysis and an adverse opinion; and having found his health south of the pillars of Hercules, has married and traded, and settled some twenty-five years ago, and bids fair to live twenty more. Yet, when with stethoscope in hand I had detected feeble respiration, prolonged expiration, dull percussion, &c., under the right clavicle, and remembered that I was

acting as referee for an insurance company, I had to pass the inevitable condemnation, and decline his payments for my clients. What then is the value of such a life? and what its future? Is there an inevitable fate attached to such a history and physical condition of the lung?

The truth must be told. These persons generally die of consumption, and sometimes break up most rapidly. The later stages of their disease are out of all proportion in speed to the middle period. An acute invasion of tubercle may end in a tolerated first stage of years' duration; but a renewal of irritation in the lung, when it does occur, is generally again acute. These two facts are to be remembered in our prognosis.

If disease has originated with acute symptoms, the break up generally rapid.

In this tolerated and prolonged first stage, without distinct lung symptoms, we have to remark:—

1. That the cause of the phenomena observed is to be sought for in the cessation of the tubercular blood disease, which seems to expand itself in the first violent attack on the lung. The further deposition of tubercle is arrested, and the deposit is tolerated because the nutritive processes have resumed a healthy activity. It is the continuity of the morbid condition which produced the original crop of tubercles, leading to successive deposits in the lung, which stamps the fatal character on ordinary phthisis, and it is the cessation of this blood disorder which enables an individual to tolerate one attack of limited tubercular deposit.

Cause of prolonged first stage.

The systemic disease has ceased.

2. The local irritation or inflammatory action in the lung tissue must have ceased in order to ensure this tolerance. Hectic is the measure not of the amount of tubercle, but of the extent of irritation in the lung. These two conditions are essential to the form of phthisis now considered.

Local irritation has ceased.

3. The digestive system must not only not have suffered in the early stage of invasion of the disease, but must have remained in fair order. This has been the characteristic feature of every case of very

Digestion must be unimpaired.

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prolonged life in all stages of phthisis which I have witnessed.

Description of patients' state.

The actual state of such patients is generally this: The fever ceases, the health improves, the waste of flesh stops, but the patient never regains full flesh. Some error of sanguification has never been retrieved. A tolerable amount of vigour remains, but he is not able for extraordinary exertions. The pulse is quiet, but capable of excitement more than it should be. According to my observation in this and other countries, the patient (if such he can be called) is not so susceptible as others to epidemic diseases, or fevers of malarious origin. He generally escapes the maladies of his neighbours, and perhaps in this carries about with him a compensation for his primary illness, and therefore has cause for thankfulness.* But he cannot bear any extra strain on the vital machinery. Prolonged exertions of mind or body, or tampering with insalubrious habits, late hours over the desk, the excitement of political, fashionable, or professional life; the struggle in which physical power commands success as much as intellectual superiority, are not for him, unless the heavy penalty of renewed blood disorder and relighted local mischief is paid for it!

Of two temperaments.

The characteristics of such individuals are to be noted. They have no hereditary taint in general, although occasional instances of the transmitted disease may be found in this class. I have observed them of two temperaments. Either they have been originally spare with high vitality, mental intelligence active or even brilliant, and the sanguine element strongly developed; or the lymphatic habit prevails, feeble pulse, slow circulation, inactive body, mental powers good but placid; often intellectual vigour as contrasted with brilliancy. Of the two, I believe the latter tends most

* Every misery that I miss is a new mercy.—*The Complete Angler*, by Izaac Walton. Lond. Ed., 1808. p. 330.

to the prolonged first stage, while the former, if attaining much chronicity in lung disease, will be found with tolerated cavity, the local disorder having reached a further stage in the outset, and then paused.

Double affection rarely attains chronicity.

The physical conditions should indicate a limited deposit in one lung. A double affection rarely attains chronicity in any stage of tubercle. By the term 'limit' is to be understood not only that the deposit is of slight extent, say to the second, or at most the third, rib, but that the physical signs stop abruptly there, and that pure vesicular breathing is heard to the base, both in the affected and in the opposite lung.

Deposit limited.

The second variety described.

The second variety which I have described as one of long-continued slight irritation of the lung, the physical signs indicating unsoftened deposit, is attended necessarily with more disorder of health than the first. This class of persons are invalids of necessity, and are capable of far less active employment in life, and of much fewer of its pleasures from travel and variety, than the first. In truth, the constitutional disorder has never wholly ceased in them, and successive slight deposits, possibly of a few tubercles at a time, keep up a low irritative systemic disquiet, and never permit the original local disease to become wholly quiescent.

Systemic disease has never wholly ceased.

Frequent febrile attacks.

There are frequent attacks of a febrile nature, partial sweatings which subside, a generally hot skin, and occasional accelerations of pulse. These symptoms are referred by the invalid to cold, but they are not of the nature of catarrh, nor yet of bronchitis. It is true that persons so affected are little tolerant of cold, moist air; they are habitually chilly, and are very susceptible of atmospheric changes; but their malaise is due to blood changes imperfectly performed, to a subfebrile state dependent on the tubercular diathesis, and to the local established disease in the lung, rather than to the phenomena of ordinary cold-catching. They are subject to congestion of the lung from these influences,

Their nature.

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and their so-called attacks are referable to this cause. An occasional blood-spitting occurs, and at such times the physical signs become more intense, and some form of subcrepitant râle indicates the irritative action which has been set up. But quiet, local depletion or counter-irritation, and cooling saline remedies, will generally restore the patient to his former condition, and alter the physical signs to those proper to a quiescent deposit without softening changes. This is the more favourable result of such attacks, but, in truth, such patients are in constant peril, and may at any moment pass into the second stage of phthisis.

Great liability to pass into the second stage.

I subjoin some details regarding this class of cases, and first give a statement of the sex, age, and duration while under observation.

Table showing the ages and sexes of 286 *cases of phthisis in the first stage, which had already attained a duration of* 18 *months and upwards.*

Ages	No. of Cases. Males	No. of Cases. Females
From 10 to 15	4	5
,, 15 to 20	16	11
,, 20 to 25	31	31
,, 25 to 30	25	38
,, 30 to 35	22	27
,, 35 to 40	16	19
,, 40 to 45	14	16
,, 45 to 50	2	8
,, 50 to 55	0	0
,, 60 to 65	1	0
Totals . .	131	155

Table showing the duration to which 286 cases of phthisis in the first stage had already attained when last seen.

Duration already attained	Males. No. of Cases	Females. No. of Cases	Total of both Sexes
1½ years . . .	5	3	8
2 ,, . . .	11	7	18
2½ ,, . . .	16	23	39
3 ,, . . .	11	7	18
3½ ,, . . .	13	18	31
4 ,, . . .	6	9	15
4½ ,, . . .	10	6	16
5 ,, . . .	8	8	16
5½ ,, . . .	5	10	15
6 ,, . . .	3	7	10
6 to 8 years . .	7	10	17
8 ,, 12 ,, . .	2	7	9
15 ,, 20 ,, . .	1	1	2
Indefinite long periods .	33	39	72
Totals . .	131	155	286

The state on leaving was—Better * . . .	84
,, ,, Worse . . .	62
,, ,, Stationary . . .	140
	286

In the above, as in some other Tables given, I state the *observed duration* only. Each case had, in other words, already lasted the period named from the earliest symptoms of the illness which could be ascertained. None had died under observation, and all were seen and diagnosed by myself. Reckoning from a former Table, † the average *observed* duration of each case of this class was 49·48 months. It is obvious, however, that this falls far short of the real duration of such cases, reckoning up to the time of death. At the close of the period during which they remained under observation, 140, or about one half, were still in

Average duration.

* i.e. after varying periods of treatment, from three months to some years.

† See Chap. on 'Duration.'

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a stationary condition, that is, neither better nor worse, and therefore likely to last for a still longer time; and this class must, obviously, much raise the duration to be assigned to phthisis, all forms taken together.

Age.

Regarding age, it is observable that great chronicity of the first stage does not occur in very early life. About fifteen, the tendency to the latent form of the disease begins; before that, our cases, especially those arising from acute or zymotic diseases, are more or less rapid, or terminate in ordinary phthisis, with only the customary tendency to prolongation. From twenty to forty-five years of age, this prolonged first stage notably prevails, and this tendency is pretty equally manifested in males and females. Of the frequent occurrence of the latent form of phthisis, no one can doubt who is familiar with practice, or with the best authorities who have written on the subject. Louis found that in 123 cases one-fifteenth were latent. Few die of the first attack of tubercle, and numbers remain with the morbid matter unchanged till a second or third attack results in a fresh deposit, at which time the first begins to soften.

Duration equal in both sexes.

To the above Table must be added that composed of cases with the physical sign called 'wavy inspiration;' and to which, as it presents features somewhat peculiar, and which have been said to characterise 'slow' phthisis, I have directed particular attention. The following cases illustrate the forms of disease which we have been considering:—

Case. First stage lasting under observation for 18 years.

G. H. B., in 1846, when aged 27, was seized with florid hæmoptysis to the amount of some oz., having been previously out of health, and losing flesh for some months. He was a tall, well-made, large-chested man, with no hereditary taint. This attack was followed by hectic, much sweating, rapid loss of flesh, and cough at first dry, but followed by considerable mucous and partly purulent expectoration. He had pain in the right subclavicular region. At this spot, for about two

inches, *there was dulness, feeble respiration, expiration prolonged, and some amount of vocal resonance.* Under the use of counter-irritation, a generous diet, cod-liver oil, and horse exercise, he slowly regained health. In 1848 (two years later) he had again slight hæmoptysis, with a recurrence of the same symptoms, which again subsided, and he felt for many years no uneasiness about his health, but continued to reside abroad. In 1855 (seven years later) he was again seen by me, and examined with a view to effecting an insurance on his life. This was *nine years* from the first attack. He was in excellent general health, and led an active life; had no cough nor expectoration, and had gained flesh (though never emaciated) within the last year. The chest movements were perfect. *The percussion note still dull under the right clavicle, with very deficient and rough inspiration, and marked vocal resonance.* The life was declined by two London offices, with this history attached to it. In 1856, I again saw him; he had rapidly wasted, sweats at night, again coughs, has frequent slight hæmoptysis. *A fine crepitus existed over the spot* where formerly deposit in the lung was alone indicated. In 1864, however, he again appears in tolerable health, earnestly following business, spare, but looking wiry, able for any ordinary exertion, without cough or expectoration. *The physical signs are the same as in* 1855. I should remark that throughout his digestion has been good and his habits regular. Here is a case which *has been under my own eye for eighteen years.* Who shall assign a duration to it? He is now 46 years of age.

Chronic 1. 7 years' duration. Oil for 7 years.

J. B., first under Dr. Quain in 1853, æt. 34; cough from childhood, short breath, much slight hæmoptysis, *dulness,* '*rough inspiration and expiration, right.*' In 1855 he came under my care; the same signs more marked, slight loss of flesh, dyspnœa, cough worse; has taken oil since 1853, which improved his appetite and digestion. He continued with variable conditions of health, but sometimes with great increase of cough, hæmoptysis, and fever, till 1860, when he was tolerably well, in fair flesh, with the same physical signs and occasional distressing cough. He had taken *oil for seven years.*

Chronic 1. Under ob-

J. J. æt. 28, light porter. June 1857.—No predisposition, cough for years; now slight, and expect. lessening; had severe

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sweats, which are better. Much marasmus (2). App. good, no diarrh. *Chest emaciated, dulness marked, resp. of whiffing character, and vocal resonance both apices*; has taken much oil, which begins to nauseate; to take cit. ferri. ex infus. Calumbæ; sedatives for cough. Admitted In-P. in August; gained 16lb. in thirteen weeks; took quinine and oil. Nov.—*Dry tubular resp. whole left.* Was once at the Convalescent Institution; twice in the Victoria Hospital; gained flesh, and when finally seen, in August 1859, was in tolerable flesh, but physical signs the same; watched 2¼ years; duration very chronic.

servation 2¼ years; duration indefinite.

Very chronic.

W. H. M., æt. 24, compositor. No pred.; ill some years; cough and moderate expect. Severe sweats two ms. ago, less now; loss of flesh and str. progressive, but rallies and gets stronger. *Dulness, impaired mobility, flattening, very feeble resp. subclav. left*; frequent slight hæmoptysis ensued; oil, and to go to country. Returned after some mths. No fever, less cough, and expectn. Recommended sea voyage; went to Black Sea and back; returned in excellent health. *Phy. signs as before*; no cough; advised to emigrate to New Zealand.

Chronic 1. 8½ years.

J. P., f., æt. 19. 1857. No predisp.; ctma. began at 11, stopped till 14, now regular; married at 17, no ch.; cough 2½ yrs., hæmoptysis at first, lately frequent; losing flesh and str., chills, night sweats, p. rapid, app. bad, vomits, b. irreg., often loose; *resp. rough, tubular, exp. prolonged, vocal res. increased, dulness, slight flattening, mob. impaired at right apex.* Has taken oil for 18 mths.; ordered alkaline mixture, with gent.; acid gall.; emplast. lyttæ. to right; afterwards oil. Aug. 1858.—Had been much better, and lost cough, but symptoms returned, with *dulness and feeble resp. at left (opposite) apex*, about 4 mths. ago, when she became pregnant. Confined March 1859; very weak afterwards, much fever, cough, and hæmoptysis. Lactation partial for some mths., but was obliged to give it up. Oct. 1859.—*Wavy respiration left*; daily hæmoptysis. Oil and quinine, with change to seaside, greatly improved her health; she regained flesh. Feb. 1860.—Scarcely any cough, hæmoptysis rare; gains flesh. Oct. 1860.—Confined 6 weeks ago of a 6 months' stillborn child; chest symptoms all worse, cough, fever, &c.; *moist crepitus left, replacing the former wavy respiration.*

Dec. 1860.—Better, less cough, no fever, gains flesh. Jan. 1861.—Called to see her child, æt. 2, who had cough, large abdomen, diarrh., *crepitating sounds over left lung*, child died convulsed 3 weeks later. May 1862.—Mother has been at Ramsgate, is much better, but looks delicate, rarely coughs, *there is no crepitation at left, but harsh resp., exp. long, and dulness as before.* Has taken oil, and tr., ferri sesquichloride, for months. Oct. 1863.—Has gained flesh, cough occasional only, pain in left base, ctma. reg., digestion good; *phy. signs as last*; she is at Scarborough now. Duration up to 1863, 8½ years.

This is an instructive instance of the second variety of tubercle, viz., that in which the patient has frequent attacks, but rallies from time to time, the physical signs not passing permanently into the second stage.

Chronic 1. Duration 5 years.

E. E., æt. 27, male. Under Dr. Cotton two years ago; hæmoptysis slight, occasional, last 4 years; expect. slight, occasional pain in left base; moderate loss of flesh and str., digest. good, no predisp. to pht.; *dulness and very marked deficiency of resp., slight dry crackle, left apex.* Is at work (carpenter); continued to improve for one year under the use of oil and tonics, when attacked by pleu. of left. Duration five years.

Chronic 1. Duration 7 years

C. F. W., m., æt. 25, smith. Hæmoptysis 7 years ago, and slight occasional ever since; cough on lying down, and in morning with mod. easy expect., slightly wasted; rather gains flesh, digestion good. *Rough dry inspiration, and exp. much prolonged, with dulness left sub.* Lost 2 st. and 4 br. by pht. Duration 7 years.

CHAPTER XII.

CALCAREOUS DEPOSITS IN THE LUNG.

CHAP. XII.

Calcareous transformation of tubercle.

Authorities.

THE frequency of the occurrence of calcareous deposits in the lung is sufficiently proved by competent observers.* It is to be accepted as a proof that nature can absorb the animal portion of tubercle.† This conversion takes place most commonly in advanced life, when it is to be regarded as the residuum of a vital and prolonged struggle against consumption. Calcareous concretions of various degrees of hardness and blackness occur in about one half of all the bodies examined at Chelsea Hospital.‡ Rogée, § in one hundred female bodies examined at Salpêtrière over sixty years of age, found cretaceous concretions in the lung in fifty-one instances. Aretæus and Galen were the first to note the expectoration of calcareous matters. Aristotle often observed concretions in the lungs of victims. Bayle has described a particular species of consumption named '*phthisie calculeuse.*' The fault of the older observers has been that the accompanying symptoms of phthisis were referred by them to the concretion, instead of regarding the latter as a natural attempt at cure,‖ and a result rather than a cause. Although very

* Williams, op. cit. See also Stokes, op. cit. p. 456.

† Turnbull, *An Enquiry into the Curability of Consumption*, p. 87. Lond. 1859.

‡ Maclachlan, op. cit.

§ *Archives Gén. de Médecine*, tome v. p. 183.

‖ See also Cruveilhier's *Transformations et Productions Organiques*, vol. ii. p. 112.

common in advanced life, the transformation may take place in the young. I have never seen it under twelve years of age.

The proofs that these concretions are due to transformation of tubercle, is to be found in the fact that they are sometimes found in the centre of a tuberculous mass; occasionally in a cavity partially emptied, and by far most commonly at the apex of the lung, which is the ordinary seat of tubercle. This transformation is also found in glands. In the inferior animals it is a very common result of tubercle. It has been observed in the thymus by Cruveilhier. Of its occurrence in the peritoneum, there is a well-marked case by Dr. Dickenson (*Trans. Path. Soc.* vol. xiv. p. 163). The man died of scrofulous disease of the vertebræ with psoas abscess. The mortar-like deposits in certain cases of chronic abscess seem analogous. A remarkable case of cancer in the lung and mediastinum, with concretions and cicatrices, due apparently to tubercle, has been recorded by myself. (*Trans. Path. Soc. of London*, vol. xiv. p. 19.)

Analysis of 10 *cases of cretaceous, bony, or horny expectoration.*

Age	No. of Cases	Period of Occurrence
12 years	2	6 months after illness commenced
15 „	1	1 year „ „
20 „	2	2 years „ „
25 „	2	3 „ „ „
30 „	1	4 „ „ „
35 „	2	Indefinite period

One half had hæmoptysis repeated several times.

With signs of the 1st stage were found 1 case
„ „ 2nd „ „ 6 cases
„ „ 3rd „ „ 3 „
10

Characters of these cases.

These cases were characterised by the frequency of hæmoptysis, the extensive portion of the lung present-

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ing physical signs, the harshness of the respiratory sounds, and the more advanced cases by considerable flattening of the chest walls. The transformation of tubercle is, in fact, accompanied by considerable contraction of the lung itself, and a lessened volume results, which is to be regarded as beneficial. These cases also tend to great prolongation. The longest living cases of tubercle in the lung, are probably those which have undergone the calcareous transformation. Who shall say at what period of life those chalky masses which we extract in our post-mortem examinations of the aged have been deposited? The tubercle formed by a fault in sanguification at puberty, and which may have threatened the existence of the individual, may remain in an altered form, and without any symptoms at eighty!

Of the ten cases of cretaceous expectoration whose history was accurately made out, six had presented the symptoms for three years, and one for six; the average observed duration being 33·42 months.

Two forms.

Two forms of this peculiar class of cases may be observed.

1. In which after an attack of disordered health, a few cretified masses are expectorated, and the patient has no further chest symptoms.

2. The more ordinary cases, in which successive attacks of the tubercular disease occur, with expectoration of chalky matter, the disease advancing slowly, while the attempt at cure is being manifested.

First variety.

Of the first variety, it is to be presumed that there are many instances to be met with in the experience of all of us. There is little doubt that numbers of individuals undergo slight attacks of tubercle with recovery; and it is probable that this cretaceous or horny transformation is the most frequent mode of conversion for the purpose of toleration or expulsion of the morbid material.

G. F. was, in 1839, attacked by slight cough, after unusual application to study. He had previously lost strength, appetite, and flesh, and began to be slightly feverish. He had no predisposition to phthisis. After some increase of cough he expectorated several small, hard cretaceous matters, which were examined by his brother, an eminent surgeon, and shown to me. He soon after regained flesh and health, and lost his cough. He is now (1865—twenty-six years later) performing most arduous clerical duties, and is in very fair health, with a large healthy family. His parents died at an advanced age, and themselves inherited longevity. The only death in his generation was from typhus.

Case. Perfect recovery.

Second variety. Imperfect recovery.

The second form is the more common. The local disease is not eradicated nor arrested by the chemical alterations in the tubercle, but successive deposits take place, much of which may continue to be cretified and expectorated, but a large part undergoes slow softening. The physical signs are diffused over a large space, and the affection is rarely single. The crepitant sounds are harsh and crackling, and well-defined cavity is rare, except in very aged persons. The following case has been under my eye for years, and is a fair example of this form of chronic phthisis :—

Defined cavity rare.

Case. 6 years.

M. H. æt. 22, f. First seen March 1861; no predisp. to pht. Has for years past occasionally expectorated chalky matters; cough slight and chiefly in morning; has lately lost flesh, but is always rather spare. Has had frequent slight hæmoptysis. *Much flattening of chest walls both sides, considerable dulness and crackling under both clavs. for some inches,* no fever, digestion good, ctma. reg.; has taken cod oil for three years. Improved much in summer by going to Scotland; gained flesh, cough less, but expectorated chalky matters about every three weeks; ordered liberal diet. There is much dyspnœa, yet the patient has for years taken an active part in a school, where much exercise of voice is required. Lately she has had an attack of diarrhœa, which much reduced her strength. I have advised perfect rest for some months. She has been ill more than six years. Dec. 1864.—I have examined her again; she has gained flesh, the physical signs are dryer; she brought me

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seven or eight calcareous matters coughed up. June 1865. —She is nearly in the same condition.

Case. 4½ years. Pht. 2.

M. A. W., f., æt. 12. Ill four years, cough constant, expect. slight, has been much emaciated, is now slightly out of flesh, expect. hard gritty matters two years ago. *Much flattening both sides, movements much impaired, harsh res. and coarse crept. with exp. prolonged whole right side, much dulness both,* is growing fast; ordered ol. morrhuæ and vinum ferri; under treatment six ms., great gain of flesh and strength, digestion good, nearly lost her cough. Phy. signs persistent. Duration 4½ years.

Case. Pht. 3 5¼ years.

G. H., labourer, æt. 29. No predisp., hair and eyes dark, cough four years, absent in summer, worse this year, hæmopty. slight, frequent expect. abundant, thick, yellow; sweats two months ago, more lately app. bad, t. white, b. reg., chest pains, expectorated cretaceous matters two years ago when under Dr. Peacock at London Hospital. *Dulness, gurgling, flattening, impaired mobility whole right side, expir. much prolonged, resp. very rough, vocal resonance increased left side.* Has taken much oil, continued under treatment 1¼ year, and left much improved in health, cough moderate. He frequently expectorated chalky matters, which were examined on various occasions. Treatment: Oil and quinine, sedatives, counterirritation.

Case. Pht. 3.

R. W., f., æt. 19. Cough two years, no hæmoptysis, no predisposition, in good general health, has frequently spat up chalky matters, ctma. reg., gains flesh, digestion good. *Cavernous blowing and gurgling to about the 4th rib left.* This poor woman felt so well that she married a few months after this report was made, but six months later I find the following note: 'Cough severe, great dyspnœa, lips livid, sweats, *gurgling extensive left, humid crepitation and ex. prolonged with harsh r. right.*'

I subjoin the following in contrast:—

Case. Pht. 2.

E. D. æt. 32, joiner. No predisp., cough one year, *cretaceous expect. six weeks ago,* with hæmopty. (the first), pain in left base, sl. sweats, has lost flesh, regains, app. poor, no diarrh.; *marked dulness upper ⅔rds of left, with humid crepitus, also crepitus post base left.* Six months later cheesy expectoration, health much improved, at work daily. Under

treatment nine months; took oil and hydrochloric acid, with iron.

The following summary may assist:—

1. Cases of cretaceous transformation occur generally in old age, but are also numerous in adult life. They are seldom met with before twelve years of age.

2. There is no early condition from which the change may be prognosticated with certainty; but it appears most frequently in cases where tubercle has been scattered rather extensively through the lung, as indicated by the physical signs.

3. A general harshness of the respiratory tones, and a diffused sharp crepitation, often resembling pleural sounds, with much impairment of the movements of the chest, and considerable flattening are the ordinary physical conditions.

4. A repetition of chalky, horny, or bony expectorations, with subsidence of the symptoms, frequent slight hæmoptysis, dyspnœa, occasional severe exacerbations of cough, with fever, alternated with periods of comparative cessation of the more distressing symptoms, form the chief features of the case.

5. The secondary disorders, as diarrhœa, are long delayed.

6. This form is generally non-hereditary, or accidental.

7. It is generally extremely prolonged, and a safe prognosis for duration may be offered, when once the condition is fairly recognised.

CHAPTER XIII.

CHRONIC SECOND STAGE.

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Stage of softening.

THE stage of softening, implying as it does a process always destructive to the tubercle, and very frequently also to the structures in which it is imbedded, is not, at first view, very promising for duration; and in truth, if it were simply a disintegration and breaking up of the morbid material and its surroundings, we should have little to note, excepting the greater or less rapidity of its course. That peculiar and conservative law which interposes periods of remission to all chronic organic changes exerts its influence here, and it is practically proved that the softening period is capable of as great if not greater prolongation than either of the other stages of phthisis.

Capable of much prolongation.

Causes which influence softening of tubercle.

The causes which influence the rapidity or slowness of the stage are referable to—

1. The nature of the tubercle, and the mode of its deposit.

2. The degree to which the lung tissue is engaged in irritative changes.

3. The cessation or continuity of the blood disease.

Nature of tubercle.

Grey—yellow.

The nature of the tubercle deposited influences the softening process directly. The grey variety has undoubtedly less tendency to soften than the yellow, and some have believed that the conversion of the former into the latter is a necessary condition to the chemical alterations undergone. That a form of tubercle analo-

gous to, if not identical with, that deposited in the external glands in strumous subjects, is met with in the lungs, and is characterised by the same slowness to change, has long been evident from the observations of a large number of cases, without reference to merely theoretical views. A separate section is devoted to our analysis of this variety, which is often found combined or alternating with enlargements of the external glands.

Strumous deposit.

There is no certain method of recognising these varieties in the living subject, but from a study of their localisation, and the history of the attack with its concomitants, a diagnosis not far removed from accuracy may be arrived at.

Recognition of these varieties.

The localisation of the physical signs is a material help. The scattered grey tubercle is more diffused throughout the lung, and the signs of deposit, although more concentrated at the apex, are spread over a larger surface of the chest, and shade off towards the base into pure vesicular respiration. The tubercle which is massed at one apex, giving rise to signs of great condensation of the lung, will be found in experience to be more likely to undergo rapid softening changes. Our hopes of chronicity must here be carried on to the third stage, when cavity has been formed. In the strumous variety, with external glandular enlargements, the physical signs will often denote a diffused deposit, most obvious over the base of one or both lungs, and such cases are commonly very slow. In examining the history of cases of large cretified masses found in the lung after death, it will be observed that they are almost invariably in the upper and back part of the apex; but the whole apex is very rarely engaged and solidified. The cases given, of small masses of cretaceous expectoration, presented signs of diffused rather than of massed deposit.

Localisation of physical signs.

Strumous often at base.

Cretified at apex.

In examining cases of retrogressive phthisis, it will be

Diffused deposit.

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commonly found that the physical signs evidence a somewhat diffused deposit. It may be presumed that the cause of this is to be found in the integrity of the intervening portions of lung. An amount of deposit sufficient wholly to obliterate any large portion of the pulmonary tissue, is necessarily accompanied by congestion of its capillaries, stasis of circulation, and inflammatory products in the structural, serous, and bronchial tissues. These changes give a character to the physical signs, and are productive of the most important and urgent symptoms in this stage. Softening is undoubtedly hastened by such congestion, probably as a result of exalted chemical affinities developed in the tubercle. In the whole history of tubercle, there is perhaps no agent so important in hastening the destructive progress of the disease as the surrounding irritation of the lung tissues. Were it not for this superadded condition, tubercle might remain inert for years, as is witnessed in the lower animals, the drying and absorbtive processes would proceed in the vast majority of cases, and in the remainder, the deposit, if not excessive in extent, might be tolerated for a long lifetime. This fact is pregnant with meaning for diagnostic, prognostic, and for therapeutical purposes.

Integrity of the intervening portions of lung.

Softening hastened by congestion.

Although tubercle has been proved to be unorganised, and therefore stands as it were outside the system, yet the changes it is to undergo are chiefly under the influences of the parts in which it is deposited. If these are highly vascular, and play an active part in the economy, the proneness to irritation and inflammatory actions is excessive. The lung, with its double circulation, itself the seat of the most active chemical changes in the body, in the immediate neighbourhood of the heart, from which the blood is rapidly propelled through it, undergoing constant motion, always exposed in its deepest recesses to the atmosphere, with a triple structure, combining the most sensitive and vitalised

Changes in tubercle chiefly influenced by parts in which it is deposited.

Lung, its structure and functions.

tissues of the body, linked by its nervous supply alike to the organic and cerebral nervous centres; accomplishing an exhalation of effete gaseous products, and of the watery waste of the blood, in addition to its own secretions, is, of all organs, that which necessarily suffers most from any foreign matter introduced into its structure. The mechanical effects of dust, as in the phthisis of stone-masons and metal-workers, illustrates the diseased process which results from simple impaction, and such cases are usually slow. But when to the foreign body thus forced in upon a machinery exquisitely delicate and at full work, is superadded the congestion of inflammatory processes, we can see at a glance what mischief is inflicted on the organ. Tubercle in bone is, on the contrary, slow to destroy, and this because the part in which it is deposited is not highly vascular, remains inert, is not the seat of chemical alterations, and plays rather a mechanical than a vital part in the economy. The peritoneum investing vital organs, and itself a secreting surface, with movements incidental to its locality, cannot long tolerate tubercle without suffering. A tubercle or two in the brain may long remain inert, unless it be placed in or near the serous lining of the organ. The mesenteric glands will tolerate tubercle till they form distended masses, making up a large proportion of the weigh of the emaciated body; and the cervical glands, playing no important part in the economy, often contain inert tubercle for years. From these considerations we may learn how important the integrity of the structure in which tubercle is developed, its moderate vascularity, and comparative immobility, are to the continuance of the latter in an inert and nearly harmless form; and how any inflammatory congestion hurries on the changes by which the destruction of the morbid product is effected.

Bone.

Peritoneum.

Brain.

The cessation or continuity of the blood disorder

Cessation

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or continuity of blood disorders.

has a powerful influence in retarding or promoting the softening of tubercle. An additional deposit in another part of the lung, or on the opposite side, commonly accompanies the destructive change in the primary crop of tubercle. It cannot be doubted also that irritation is kept up and increased by a supply of contaminated blood constantly presented at the seat of the original disease. By whatever derangement of vital actions the elimination of tubercle in the pulmonary tissue takes place, it is obvious that its continuance must prevent the primary mischief from becoming tolerated and inert. As remarked by Rokitansky, 'no local healing processes would be fraught with any value for the individual unless accompanied by the extinction of the fundamental tubercle-producing crasis.'

The greatest importance, then, is to be attached to the state of general health of the patient, and to the cessation of the cachexia in which the emaciation, fever, and disorder of the secondary processes of assimilation have their origin. With an amendment in those functions which are performed in the penetralia of organic life, tubercle will not readily soften, and its inherent tendencies (if it have any) may be postponed indefinitely. If there exist no certain means of ascertaining the species of tubercle which is deposited, there are at least unmistakable symptoms and physical signs of the constitutional disorder, and of the accompanying inflammatory actions on which, more than on any other agents, depend the present security of the patient, and his chances of prolonged life, or even of ultimate cure.

Characters of arrested phthisis.

When phthisis in the second stage becomes chronic, that is, when its duration extends beyond eighteen months, with some prospect of the life of the patient being still further prolonged, it exhibits certain features which are recognisable to the careful observer. They may be classed as constitutional and local.

The first is characterised by longer intervals between the attacks of hectic, during which the pulse subsides

to a healthy standard, the skin is natural to the touch and to the sensation of the patient, and the sweatings have ceased. The tissues of the body are better nourished; there is gain of weight, and appreciable increase of plumpness of features, and the chest is better covered. The muscular system is invigorated, and there is more power of walking and of sitting, while the distressing lumbar weakness of the great longitudinal supports of the frame is not nearly so constant nor intense. The features no longer express exhaustion, the eye is less excited and brilliant, the cheek less sunken, the mouth more calm and less suggestive of dyspnœa. The sleep is more natural, the night cough subsides, and is represented by two fits only—that on lying down and rising. The appetite improves, the tongue is cleaner, irritative dyspepsia, shown by thirst, red and furred tongue, and occasional diarrhœa or relaxation, ceases.

Constitutional state.

The local signs improve as well as the local symptoms. An important change occurs in the crepitant moist sounds which characterise the second stage of phthisis. They become dryer, are crackling rather than bubbling, and occasionally pass into clicking and creaking sounds, conveying the impression that the consistence of the opposing medium has become more glutinous and less fluid. The true humid crepitus, which might be compared to a stream of small bubbles, caused by air blown through gruel, is more of a crackle, and has fewer bubbles.

Local signs change.

Moist sounds become dry.

This is a most favourable and important change. With this the sibilant râles and rhonchi subside, and the dulness may become a shade less. The meaning to be gathered from the alteration in the character of the sounds is that the inflammatory and irritative action in the lung tissues has subsided, and that active softening has ceased: there is, in fact, no progression of the destructive process.

Sibilant râles subside.

With this concurrence of favourable conditions the patient may go on for years, presenting only occasional

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exacerbations of disorder, and a persistence of the above physical signs.

It is no longer doubtful that a complete disappearance of the crepitant sounds and a comparative restoration of the patient's health may occur in this stage, and of this instances will be given; but there is no reason to suppose that tubercle is ever absorbed or removed (by other than cretifactive changes) in the second stage of phthisis. The cessation of the humid sounds is due not to elimination of the deposit, but to a removal of the inflammatory action in the lung, and to a drying or retrogressive change in the tubercle. There remain but two conditions to expect when once tubercle has in any degree softened, viz., its transformation into horny or chalky matter, or its further softening to form a cavity. In all the instances which have been examined, when softening sounds ceased, there remained a permanent harsh inspiration, expiration prolonged, slight dulness, and other signs indicative of the phenomena of deposit. The persistence of these physical signs is, on the other hand, 'no proof that the patient is not progressing satisfactorily or that his disease is not arrested.'*

Cessation of humid sounds not due to elimination of the tubercle.

The symptoms of arrest of phthisis must be derived from the two sources of evidence at our command—cessation of constitutional disorder and alterations in the physical signs. With the concurrence of these two the fact is unmistakably certified to us; but by adopting an opinion formed on one only we may be deceived. Increase of weight while taking cod-liver oil is occasionally attended by advance in the local disease, and although this is a rare occurrence—the rule being that while nutrition improves the lung disease remains at least stationary—the fact illustrates our proposition that an improvement, to be trustworthy, must be evidenced both by symptoms and by physical signs.

Evidence of arrest must be taken from both symptoms and signs.

* *Phthisis and the Stethoscope.* By Richard Payne Cotton, M.D. 3rd ed. Lond. 1864.

Table showing age and sex of 266 cases of chronic phthisis in the second stage which had attained a duration of more than 18 months.

Age	No. of Males	No. of Females	Total
Under 10 years	1	0	1
10 to 15 ,,	3	3	6
15 ,, 20 ,,	12	15	27
20 ,, 25 ,,	29	18	47
25 ,, 30 ,,	26	26	52
30 ,, 35 ,,	23	20	43
35 ,, 40 ,,	22	19	41
40 ,, 45 ,,	15	12	27
45 ,, 50 ,,	8	3	11
50 ,, 55 ,,	7	2	9
55 ,, 60 ,,	1	1	2
Totals .	147	119	266

The way to read this Table is that between ten and fifteen years of age six cases were observed, of whom three were males and three females, &c.

Table of the observed duration of cases of chronic second stage, with the sex.

Attained Duration	Males	Females	Totals
2 years	7	8	15
$2\frac{1}{2}$,,	14	8	22
3 ,,	8	7	15
$3\frac{1}{2}$,,	15	10	25
4 ,,	9	8	17
$4\frac{1}{2}$,,	9	12	21
5 ,,	10	4	14
$5\frac{1}{2}$,,	5	1	6
6 ,,	5	2	7
7 ,,	11	8	19
8 ,,	4	3	7
9 ,,	1	3	4
10 ,,	3	5	8
10 to 12 years	5	4	9
12 ,, 15 ,,	3	3	6
15 ,, 20 ,,	2	2	4
Indefinite long periods	36	31	67
Totals .	147	119	266

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The way to read this Table is that of cases which had attained a duration of two years in the second stage of phthisis, seven were males, eight were females—total, fifteen, &c.

The average observed duration of 203 such cases * was 67·35 months, not allowing for those of indefinite periods. The state on leaving the hospital must be taken into consideration. Of 266 cases,

62 were better on leaving ;
72 were worse, of whom 7 died ;
132 remained stationary.

We thus see that patients in this stage of disease, who have been ill more than eighteen months, may, if the disease be then quiescent, reasonably hope for a considerable prolongation of their lives ; and that the chances, at least, are that they will not die for forty-nine months, or something over four years, that being the expectation of life to be deduced from the above Table. The real expectation must be much higher than this, for of these 266 observed cases only seven had died. Of the seven deaths—

1	occurred	at the end of	$2\frac{1}{2}$	years	from the commencement of the disease
1	,,	,,	3	,,	,,
2	,,	,,	5	,,	,,
1	,,	,,	$5\frac{1}{2}$	,,	,,
1	,,	,,	6	,,	,,
1	,,	,,	7	,,	,,
7					

From the above Tables have been eliminated all cases of tubercle very sparsely diffused through the lung, or spreading over a large pulmonary space. This variety has seemed to be so important that I propose to consider it briefly in a separate section. The following cases are illustrative of the second stage of phthisis in its chronic form, and also of the possibility of its cure.

Case. Moist crepitus replaced by

July 1856.—T. D. æt. 20, m., servant. No pred., parents living over 50 ; cough 3 ms. ; no hæmoptysis ; expect. thick, yellow, moderate, increasing, night sweats, marasmus 2, rapidly

* See page 77.

losing flesh, now 9 st., app. good, b. reg., t. furred, *flattening, dulness, humid crepitus, and increased vocal resonance for some inches subclav. right*; ordered oil, pil. acid gall. c. morph. ij. om. nocte; solut. iod. dextro. To go to Brighton. CHAP. XIII. dry sounds. Recovery of health.

December 1856.—Been at Brighton 4 ms., no cough, raises no phlegm, no perspirations; weight, 9st. $1\frac{3}{4}$lb; app. good, eats meat three times a day; does not feel weak nor languid, 'if he runs ever so fast does not feel his breath the least affected;' *dulness not great, but decided; flattening of chest walls on right; mobility manifestly impaired over whole subclav. and four inches lower; expiration equal to inspiration, and rough; inspiration rough, and sensibly less than opposite side; no crepitant sounds, vocal resonance slightly in excess; the lower anterior chest rough and slightly wavy inspiration; the expiration at this part not so much prolonged as above, but still sensibly so.*

Maria S. æt. 16. June 1856.—No predisp.; ctma. not ap.; ill two years, with cough, and expect. lately severe at night; profuse night sweats for some weeks, lessening; app. mid.; no diarrh. *Considerable dulness both subclav. regions, moist crepitation for some inches left, the same signs, but less marked, right.* Ordered oil with ferr. cit. ex infus. Calumbæ, and sedatives for cough. Case. Pht. 2. 4 years. Moist sounds disappear.

August.—Gained flesh, exp. less, but got worse in following winter, improved much in spring; first catamenia in June 1857; dyspnœa; no cough, but *physical signs as before* (i.e. *moist crepitus*). Gained flesh in summer, and in March 1858 I find the following note: 'Chest carefully examined: *prolonged expiration, the only abnormal sound, no crepitus, &c.*; scarcely ever coughs, great gain of flesh, looks in fair health, but rather pale; is going to service; has taken oil for 2 years. Duration 4 years.'

(I am indebted to my colleague Dr. Quain for the greater part of the notes of the following most interesting case. For the last two years the patient was under my own care.)

June 1851.—W. W. æt. 18, bandsman, Life Guards. No predisp.; played flute last 5 years, and feels no distress from it; subject to short cough last two winters, no hæmoptysis, is a little hoarse, slight loss of flesh, no sweats, digestion good. Case. Prolonged 2nd stage. Morbid sounds disappear.

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Oil taken for 8 years

Dulness and crepitation under clavicle, left, breath clear behind. Ordered cod oil; iodine externally; pil. conii c. morph. Oct.—Doing very well, only morning cough, *dulness tubular resp. and coarse crep. at second cartilage left.* Feb. 1851.—Feels well; no distress from blowing trumpet; slight yellow expect. occasionally only, has gained flesh. March 1852.—Cough very little, continues his occupation; *phy. signs as before, only voice sounds more resonant left,* grows stout and tall. May.—*Flattening of chest walls, heart beats high, a few large crepitant râles, breathing loud on inspiration and expiration*; health good. Dec. 1852.—*Dulness, creaking (not crepitation) left,* feels well; oil has been regularly taken throughout. July 1853.—At Chobham Camp, doing very well; sounds much as last. April 1854.—Cough occasionally only in the morning, feels well, *loud expiration, no crepitus, dulness slight, some flattening left, resp. right loud and clear.* Oct. 1854.—Has coughed lately, much exposed to weather, rather free hæmoptysis, nausea, acidity. Ordered caustic sol. of iod. freely to chest; he soon got better, but had lost flesh. Feb. 1855.—*Rather weak inspiration left.* May.—Doing well, scarcely any cough, gains flesh, app. good, continued occupation and oil. Feb. 1856.—Hæmoptysis profuse; from this attack he recovered and resumed the treatment. May 1859.—He has taken cocoa-nut oil for some time, is in fair general health, and continues much the same as last report; actual duration ten years; under observation and treatment eight years.

This case derives its interest from the fact of its having been under the observation of skilled observers for eight years; from the continuous treatment by cod oil which was carried out, as well as from the remarkable physical changes in the lung, and concurrent improvement in health.

Case. Pht. 2, at apex. Sounds become dry.

July 1856. — W. J. æt. 47, gamekeeper. No predisp., cough for two years, now night and morning and on exertion; hæmopt. half pint nineteen years ago and last week; no sweats; weight was 13 st. two years ago, is now 11 st. 2¼ lb., app. good, b. reg., pain in right base, dyspnœa. *Dulness, moist crepitus two inches subclav. right.* Oil, solut. iod. to

the right; pil. conii c. morph. Oct. 1856.—Expect. less, no night cough, looks very well, gained 7 lbs., follows his occupation. Ol. ʒiij. ter in die. April 1857. — Easier, a little phlegm in the morning only, cough only on exertion, and slight dyspnœa if he runs, looks very well, weight 11 st. 11¼ lb.; continues oil. *No moist sounds, blowing expiration and inspiration, and voice rather resonant at apex right.* To take oil. I have not seen him since; duration about three years; under observation nine months.

Case. Passage from 1st to 2nd stage. Duration, 3¼ years.

Oct. 1852.—E. H. æt. 24, carpenter. No predisp., cough two ms, slight hæmopty. twice, loses flesh, *dulness, harsh dry inspiration, with sibilus left subclav.*; ordered oil, and iodine externally. April 1853.—Much better, disease appeared arrested, treatment continued till March 1854, when only sign *was very loud expiration left*; cough rare. October same year even this sign was scarcely perceptible, but *the right apex was almost crepitant.* June 1855. — *Dulness and deficiency both apices, marked humid crepitus left.* At this time he went to the country in tolerable health with slight cough only, but occasional hæmoptysis, no fever. Had taken oil under observation for 3¼ years. (*The notes are by Dr. Quain and myself.*)

Case. P. 2. One lung. Improvement.

J. G. æt. 20, policeman. Maternal predisp., profuse hæmopty. six ms. ago, repeated two ms. ago, had sweats, weighed 11 st. 3 lb., now 10 st. 11 lb., cough, dyspnœa, and mod. expect., digestion good, *dulness and humid crep. throughout right side*; ordered oil, and solut. iod. dextro. Six ms. later *phy. signs the same,* very little cough, scarcely expectorates, general health good, face rosy, walks any distance without fatigue, weight 11st.

Case. Pht. 2. Phy. signs disappear twice, and return after 1 year. Duration. 5 years.

J. R. æt. 24, embroideress. Br. and sister died of phthisis, cough two or three years, no hæmopty., abundant increasing expectoration, night sweats, rapid pulse, loses flesh, app. poor, t. red, no diarrh., palpitation, ctma. reg.; *dulness and humid crepitus for two inches subclav. right*; ordered gallic acid, citrate of iron, oil, iodine externally. March 1857.— In good flesh, no fever, cough slight, feels well; *rough resp., exp. prolonged and harsh, no moist sounds right.* March 1858.—*Slightly humid crackle again at right apex, exp. prolonged,* evening fever, urine deposits; ordered effervescents, omit oil, iodine paint. July 1858.—*Humid sounds*

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are again replaced by rough insp., and exp. prolonged; health much improved. December 1858.—Has taken oil again for some months; *there are no abnormal physical signs in right apex*, cough slight and occasional, in good flesh. Feb. 1860.—Cough again returned, some dyspnœa, but can run up-stairs; has gained flesh, app. good, looks very well, has not taken oil since 1858; *humid crepitus again under the clavicle right*; to resume oil. In March she was better. I have not heard of her since. Under observation over two years; duration about five years.

Case. Showing the progress through all the stages. 5¼ years.

March 1854.—R. T. æt. 37, farmer, well to do, m., four ch. Dyspnœa, pain in right side and apex, little cough, no expect., *breath sounds tolerably clear*, feels weak. Ol. morrhuæ ℥ij. bis mist. gent. alkal. ℥j. bis. Dec.—Doing well, excepting a recent cold; still taking oil. April 1855.—Hæmoptysis slight, occasional; cough more troublesome, expect. increased, some sweats and chills, loses flesh, weight 10 st. 10 lb., *dry crep.*, *bronchophony right subclav.* The hectic continued till July, when it increased, and all symptoms began to improve; weight 10 st. 2¾ lb. In August he weighed 10 st. 5 lb.; oil ℥ss. bis die. April, 1856.—*Moist large crep. for six inches right*, looks well, w. 10 st. 4½ lb.; he improved till August, when app. failed, cough worse. He continued to reside in the country, and came to London for advice once a month. April 1857.—Cough worse, p. in left, expect. increased, no hectic, diarrh. began, *extensive gurgling on both sides*, w. 9 st. 11½ lb.; ol. and quinine; iodine sol. externally; sedative mixture. August.—W. 9 st. 5½ lb., symptoms worse, slight hectic; quinine in large doses, oil.—June 1858.—W. 8 st. 10½ lb., very weak; rep. remedia. June 29, 1859, obiit. Total observed duration of case five years and three months. The premonitory stage in this case lasted more than one year; the hectic, coinciding with the signs of softening, three months. After a rapid reduction of weight at this time he regained flesh, but not to his former standard. A second and considerable reduction occurred in 1856–7, when the opposite lung became rapidly attacked, and cavities were established. From this on he steadily but slowly lost, yet lived two years two months. The use of oil in prolonging life, by retarding the successive stages of the disease, is well seen.

Chronic Diffused Tubercle.

From numerous observations, I have ascertained that tubercle when diffused or spread throughout a large surface of one or both lungs undergoes its destructive changes slowly, and in certain instances dries up. This condition indeed prevails in most cases of cretified transformation. It is therefore to be regarded as, on the whole, a state tending to chronicity or prolongation, and in certain cases to cure. It is more favourable then when the deposit is massed in one or both apices. Taking the average duration while under observation of all cases of phthisis in the Tables given as two years and six months, the diffused tubercle cases averaged thirty-seven months, while ordinary phthisis was as low as fifteen months. Doubtless this slowness to destruction is mainly due to the integrity of the intervening portions of lung being preserved, for when inflammatory action is going on, the irritation of a large portion of pulmonary tissue would necessitate excessive hectic, and rapid exhaustion of vital power. That scattered tubercle is more tolerated than that which is infiltrated into a large but limited portion of the lung, may be regarded as a rule. The latter condition softens more readily and tends to form a cavity; the former, so long as the separate masses of deposit do not coalesce, has little tendency to break up, but for the maintenance of the quiescent state it is necessary that the lung should not undergo irritative or inflammatory changes. The reverse may be said of the third stage, for when tubercle has softened and formed a cavity, one of the chief conditions of temporary safety for the patient is, that it should have been massed into one apex with a well-marked limit, and that the remaining portions of the lung should be free from deposit. A diffused deposit is therefore favour-

Diffused tubercle undergoes changes slowly.

Average duration high.

Its chronicity due to integrity of intervening portions of lung.

Tubercles coalesced soften quickly.

Reversed condition indicates chronicity in the 3rd stage.

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able (of course within certain limits) for chronicity in the first and second stages of phthisis, but unfavourable in the third or stage of excavation. Of course, by 'diffused deposit' we do not mean the rapid infiltration of the whole lung which forms one of the varieties of acute phthisis. It is also necessary in estimating any single case to avoid mistaking an old deposit at the apex with gradual extension to the base, or to the opposite lung, for one of 'diffused tubercle.' The distinction may not at first sight be easy, but in the former case (that of extending disease) *there is almost always an advance in the stage of the tubercle first deposited at the same time that a fresh deposit takes place in another part of the lung.*

Characters of chronic diffused tubercle.

The characteristics of chronic diffused tubercle may be thus enumerated :—

1. Chest movements generally considerably impaired, not at one part (as the apex) only, but over a large range of ribs on one or both sides.

In certain instances I have observed this form of the disease in persons of large well-shaped chests, in whom the movements were only slightly impaired.

2. A corresponding but slight flattening of the walls occupying a greater space than the usual subclavicular depression.

3. Moderate dulness of the percussion note of the same diffused slight character.

4. The signs of deposit or of softening less concentrated, occupying more of the pulmonary area, and being more of a mixed character, that is, not uniformly shading off from apex to base as in ordinary phthisis, but the softening indications always moderate and found at some point (often near the middle of the lung) more advanced than at another, as indicated by a more humid character of the crepitation.

5. A tubular character of the respiration may be present in patches, indicating greater condensation of

lung tissue, but these patches should be of limited extent.

6. A more crackling character, and more dry tone of the crepitus, than is noted in cases of ordinary softening.

7. Occasional pleural friction sounds are intermingled with those of crepitation, and intercurrent attacks of dry pleurisy are not uncommon.

It will be observed that the condition to which I have given the name of 'diffused tubercle' is much more common among males in the proportion of about two and a half to one, and that the age at which it is most frequently met with is from thirty to forty-five or fifty; in females from twenty to forty. In constructing the following Tables, all cases of 'strumous deposit' have been eliminated (and will be found in a separate Table), which accounts for none of the cases being under fifteen years of age. In by far the larger proportion, the disease was found in both lungs, and in about five-sixths it had advanced to the second stage.

Table showing the age and sex in 149 *cases of tubercle diffused through one or both lungs.*

Age	Males	Females	Totals
15 years	7	2	9
20 „	9	6	15
25 „	20	8	28
30 „	23	7	30
35 „	18	9	27
40 „	15	5	20
45 „	10	3	13
50 „	6	1	7
Totals .	108	41	149

One lung only was affected in 16 cases
Both lungs were „ 133 „
The disease in the 1st stage (deposit) . . in 21 cases
„ „ 2nd „ (softening) . „ 128 „

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State on leaving the hospital.

Better	40
Worse (of whom 5 died)	46
Stationary	63

The five deaths all occurred in patients in whom both lungs were affected; four of whom were in the second, and one in the first stage of phthisis.

Observed duration of 149 *cases of tubercle diffused through one or both lungs.*

[This Table only expresses the duration while under observation.]

Duration	Cases	Duration	Cases
6 months	6	5 years	0
1 year	14	6 „	5
1½ „	16	7 „	2
2 years	10	8 „	1
2½ „	13	9 „	5
3 „	4	10 „	1
3½ „	12	Over 12 years	1
4 „	6	Indefinite long periods	46
4½ „	7		
		Total	149

The average duration of each case of this class is 37·51 months, without taking into account those ill for long indefinite periods.

The invasion of this form of the disease is occasionally very acute; a profuse hæmoptysis followed by violent hectic, dyspnœa, and considerable emaciation, may commence it; but after a month or two these symptoms may subside, and the patient if jucidiously treated may attain that quiescent state in which he is to remain for months, or even years. The other form of invasion is more gradual, and this is the ordinary commencement of such cases. In forming a prognosis it is important to remember the possibility of very acute symptoms becoming chronic, as well as of a

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chronic disease being instituted in the slowest manner. The symptoms attending this condition are those of chronic second stage. There is habitual cough and dyspnœa, expectoration moderate, not uncommonly profuse hæmoptysis, which much reduces the patient, and alters the character of the case, being frequently indicative of a passage into the third stage. The formation of cavity is however comparatively rare in this variety of phthisis, and when it does occur, is of the anfractuous form, and never a circumscribed excavation. When the lung breaks up it does so in many parts at once; and the termination of such cases is very often from an intercurrent pneumonia, rather than from the wearing down processes of hectic and diarrhœa. Bearing in mind that the preservation of the patient depends on the integrity of the intervening portions of lung, we shall readily understand how little tolerant he could be of inflammatory or congestive attacks, so much of the lung space being already impacted with tubercle.

Symptoms.

Hæmoptysis.

Formation of cavity rare, or of the anfractuous kind.

Inflammatory lung attacks common.

Dyspnœa is a leading symptom,* and is more felt in this than in other forms of the disease which are equally tolerated by the system. A limited cavity gives rise to less distress of breathing than an extensive diffused deposit in the lung. This result is what might be expected. Pulmometry confirms the observation; the cubic inches of air capable of being registered by the spirometer being much fewer in diffused tubercle than in cases of cavity in one lung.

Dyspnœa.

On the whole, while there is temporary tolerance of disease, the average of health and of nutrition is lower in this class of patients than in those with tolerated cavity; and the diminution of respiratory space is of itself sufficient to account for this.

State compared with tolerated cavity.

Attacks of pleurisy of the dry form are very common,

Pleurisy.

* To this there are exceptions. One of my patients, ill for three years with diffused tubercle in both lungs, was able to follow his occupation as choral singer at the opera.

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and cause much distress. Dissection generally shows very extensive adhesions, often of the whole pleura. The patient is very free from the chances of pneumothorax and pleuritic effusion.

Found in the rheumatic diathesis.

A diffused deposit in the lung is not uncommon in that form of phthisis which is found in the rheumatic temperament, and with disease of the heart. Out of 146 cases of this kind, I have found it in thirty-six, or about one-fourth of the whole. In twenty-six instances there was disease of the heart; and in ten, rheumatic fever had existed previously. It will be seen that rheumatic phthisis tends to form cavities, and next to this, the diffused deposit of tubercle is the most common.

Prognostics.

The favourable prognostics in chronic diffused tubercle may be summed as follows:—

1. Phthisis not hereditary.
2. The male sex.
3. Age over thirty.
4. Dulness ranging over a large extent of one or both sides, and not extreme.
5. In most cases slight contraction of the chest walls on one or both sides, and movements impaired.
6. In certain fewer instances, large well-developed chest, with movements good.
7. A diffusion of the physical signs, consisting of roughness, expiration prolonged, and humid or crackling crepitation over a large space.
8. A dry character of the crepitus, or (more favourable still)—
9. A transition from moist to dry crackle, and, still further, to simple harshness of the inspiratory tone.
10. A moderate and stationary amount of emaciation. These cases never fatten, as chronic cavity cases occasionally do.
11. A lessening amount of expectoration; slight occasional hæmoptysis being generally productive of little

or no inconvenience, and not accompanied by an extension of the physical signs.

12. Absence of fever.

13. Integrity of the digestive processes.

The above facts must be ascertained from more than one examination of the patient, and by a careful comparison of the history of the case with the actually existing signs and symptoms.

The bad prognostics are, simply an expression of the liabilities of this form of phthisis, and stand in the following order of danger:—

1. The occurrence of congestion of the lung—intercurrent pneumonia.

2. Profuse hæmoptysis, especially if rapidly repeated.

3. Rapid formation of cavity of the anfractuous kind in any part of the lung.

4. The rapid extension of disease in the same or the opposite lung.

5. The ordinary events of advanced phthisis, which are in this form generally delayed; such are ulcerated larynx, diarrhœa, &c.

Case. Pht. 2. Diffused single.

Moist sounds disappear. Deposit in opposite lung.

Observed 4 years.

July 1856.—J. P. æt. 11, m. No predisp.; ill 18 months, cough, slight hæmoptysis, emaciation, but gains flesh lately, no present sweats, no diarrhœa; *moist crepitation and dulness, diffused, left side.* Ordered oil, quinine and iron, sedative mixture. January 1857.—Still much out of health, loses flesh; *signs persistent,* dyspnœa. Hydrocyanic acid and morphia for cough, oil to be continued, iodine externally. April 1857.—Has been in the country 3 months, looks very well, colour good, much gain of flesh, expectoration slight, some dyspnœa on exertion, appetite good. *The moist crepitation is replaced by dry, nearly vesicular respiration, slightly wavy.* To go on with oil. He continued to improve till December, had hæmoptysis in January, the oil disagreed. In March, was feverish and lost flesh and colour. June 1858.—*Dry blowing respiratory sound left, and diffused dry crepitation right.* Under the use of counter-irritation he again rallied, resumed the use of oil, with v. ferri; and in Sept. 1860 was in tolerable health,

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with the same physical signs. Under observation over 4 years, duration $5\frac{3}{4}$ years.

Case. Chronic diffused tubercle for 9 years. Cavity. Improved health and physical signs.

January 1859.—J. N. æt. 13, m. No predisp.; cough about 5 years, after varicella, no hæmoptysis, expect. moderate, night sweats, loss of flesh lately, pain in left, app. large, t. foul, b. loose; *dulness, flattening, rather dry crepitation diffused over whole lung, anteriorly and posteriorly on both sides, but more marked on right.* Ordered syrup, ferr., iod. and ol. In March he was much improved, scarcely any cough. Rep. remedia. *The crepitant sound much clearer in front.* November 1859.—Been in country 4 mths., has grown much, complains only of dyspnœa and occasional cough; *no moist sounds, very harsh respiratory tone both sides.* Dec. 1862.—*Dulness and diffused dry crepitation whole left, coarse crepitus subclav., and dry crep. diffused at base right,* cough and dyspnœa had returned, looks ill: relieved by croton liniment, morphia and quinine. March 1863.—*Gurgle and cavernous blowing over an irregular space for some inches at apex ant. and post., clicking over base left, tubular resp. at post. apex,* base pretty clear, right; great improvement in general health and appearance, colour good, eats meat four times a day, and takes three glasses of beer, no fever, morning cough, and moderate thick expectoration, leads an active business life, has not taken oil lately. April 1864.—Doing very well; *same physical signs.* Under observation 5 years, duration probably 10 years.

This interesting case shows the persistence of the physical signs of tubercle diffused through both lungs for years, and the formation of cavity, after nine years, with a concurrent clearing up of the bases of both lungs, and equal improvement in general health. The prolongation of the case is not due to the use of oil, but rather to a liberal meat diet, and frequent exposure to fresh air.

Case. Very chronic. Pht. 2. Fistula 18 years.

W. H. æt. 45, m., servant. No predisposition, hæmoptysis 14 years ago, again 12 years ago, again lately, mixed, florid, one pint, cough habitual for years, expectoration scanty, embonpoint very good, no sweats, digestion fair, has had fistula in ano for 16 or 18 years; *dulness, and spongey moist crepitation diffused over whole right side.* He was only under

observation for two months, but continued pretty well, taking oil.

In this case, doubtless, the disease had remained in a quiescent state for many years.

Pht. 2. 5 years. Diffused tubercle.

July 1857.—F. H. æt. 17, m., floor-cloth painter. No predis., delicate for some months, growing fast, 'caught cold,' cough on waking, no expect., night sweats, marasmus 2, app. bad, b. reg., pulse 116; *dulness and humid crepitus over whole left front.* Ordered oil and gallic acid. October.—Much better, cough less, no fever; *same physical signs.* Improved throughout year 1858. In Dec. was In-Patient, gained 9 lb. in weight. April 1859.—Hectic, increase of cough, pain in left; was blistered, oil continued and sedatives, iodine repeatedly applied. March 1862.—In fair flesh, cough moderate, no fever, digestion good; has taken oil nearly 5 years; *physical signs the same.* Under observation 5 years.

Diffused tubercle both lungs. Oil for 6 years. Duration 8 years.

April 1855.—J. C. æt. 28, tailor. No predisp., ill four years, cough which varies, now severe, no hæmopty., sweats lately, loses flesh, now weighs 7 st. 5½ lb., app. bad, b. reg. Has taken oil 18 ms., but lately left it off, since which he is worse; *dulness, impaired mobility, dry small crep. diffused over left front; same signs less on right side.* Ol. ℥ss. bis die, pil. acid gall. ij. om. nocte. January 1859.—Has now taken oil for 6 years, cough very slight, scarcely any expect., in tolerable flesh. *Phy. signs the same.* Under observation 4 years, duration 8 years.

Case. Diffused tubercle not softened. Duration indefinite.

July 1858.—J. W. æt. 20, clerk. Br. d. pht.; no hæmopty., cough for an indefinite period; slight, thick, grey expect., marasmus 2, formerly severe night sweats and diarrhœa, none now; has taken oil. *Dulness very marked and extensive, with tubular rough blowing resp. over whole front left, bronchial voice at post. apex right*; weight 8 st. 10¼ lb.; ol. ℥iij. b. die, syrup of morphia, iodine to left chest. Sept. 1858.—Has gained one stone in weight, cough and expect. slight, no sweats, app. fair. 1859 and 1860 doing well. In 1861 somewhat reduced by diarrhœa, but improved again on ferri sesquichlorid. and oil. Under observation nearly 3 years, duration indefinite.

Case. Diffused tubercle left. 5½ years.

August 1858.—S. W. æt. 34, f., servant. No predisp., cough two years, hæmopty. four months ago, lately sweats, and diarrhœa, ctma. reg., loses flesh; *dulness and extensively*

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diffused crepitus left. Oil, iodine externally, pil. conii c. morph. January 1862.—Has taken oil 3½ years, doing well. *Phy. signs as before.* Under observation 3½ years, duration 5½ years.

Diffused tubercle double. 8 years.

R. W. æt. 27, waiter. Maternal predisp., constant cough 8 years, hæmopty. frequent, streaky, formerly severe sweats; is only slightly wasted, expect. considerable, digestion good, never had diarrhœa; *dulness, diffused dry crep. from apex to base left, diffused smaller crep. of a dry character anteriorly right.* Improved much on oil and sedatives, with counterirritation. Duration over 8 years.

Diffused tubercle double. 4 years stationary.

Nov. 1857.—A. H. æt. 23, porter. No predisp., hæmopty. one quart eight ms. ago, slight five wks. ago, cough eight ms., abundant increasing expect., marasmus 2, strength fails, sweats formerly, digestion good; *dulness very marked, extensive coarse crep. of a dry character left, crepitus base post. right.* Ol. mist. ferri, c. calumb., linctus, opii. Improved steadily. Went to Bournemouth and Torquay, and in Feb. 1861 was doing well. *Same physical signs.* Under observation and taking oil 3½ years, duration over 4 years.

Diffused tubercle double. 9 years.

September 1858.—W. F. æt. 42, painter. No predisposition, hæmoptysis six years ago; two inflammatory attacks on chest with hæmoptysis since. Under Dr. Cotton three years ago. Partial aphonia for years, marasmus 2, not losing, expect. considerable, no fever, digestion fair; *diffused double crepitation of a moist clicking character, largest at both apices, bases scarcely clear.* Oil and chloric æther mixture. In Dec. 1861 was doing well; had taken oil; 3½ years under observation; *same physical signs.* Duration over 9 years.

Chronic diffused tubercle mitral disease and hypertrophy.

C. B. æt. 12, schoolboy. No predisp. to pht. or rheumatism, has had three attacks of rheumatic fever in last four ms., had cough for an indefinite long time previously, very anemic, much wasted, with orthopnæa at night, no œdema. *Cardiac dulness very extensive, impulse much increased, whizzing, mitral systolic murmur. Dulness whole right chest, and diffused moist crepitation.* Ordered tr. digitalis with salines, blister to region of heart; was much relieved a month later.

Diffused tubercle. Mitral disease.

E. T. æt. 40, upholsterer. No predisp.; out-patient for some years (Dr. Quain, Dr. Pollock); no hæmoptysis, cough habitual, severe, with scanty difficult expect., considerable wasting, distressing dyspnœa, remarkable arcus senilis. *Dulness, extensive diffused humid crepitation anteriorly left, strong*

impulse cordis, double rough mitral murmur. Ordered mixture of squill, æther, tr. lobeliæ, also emp. lyttæ, which relieved; afterwards chloric æther, and stramonium. He was much in the same state one year later.

Double diffused tubercle. Rheumatic fever. Disease stationary 3 years.

Nov. 1857.—J. B. 44, tailor.—No predisp., cough for two years, with mod. expect., no hæmopytsis, spare habit, no loss of flesh, no fever, app. good, b. reg., t. very white. *Humid crep. both sides diffused, with more dulness on right, but crep. to base on left.* To take oil and pil. conii c. morphia, linimentum ol. crot. pectori. Feb. 1858.—Doing well, less dyspnœa. March.—Acute rheumatism of joints. Treated with salines and colchicum. Improved much on quinine afterwards, and chest disease remained chronic and quiescent while under observation for some months.

CHAPTER XIV.

CHRONIC THIRD STAGE.

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Third stage. Definition.

THE third stage of phthisis may be said to be reached when masses of tubercle in the lung have become involved in such a process of softening as to cause destruction of the lung tissue to an extent sufficient to originate the physical signs indicating cavity. Of course, every softened tubercle makes a cavity; but aggregation of the deposit, clearing out of the morbid matter, and destruction of the lung tissue, must coexist to some considerable extent to form this stage.

Localisation of cavity.

Its locality, as is well known, is generally at the apex of one lung; but in rarer instances an excavation is found towards the middle, or at the base. Excepting in a very rapid form of the disease, it is very rare to find cavities in both lungs produced simultaneously. Such an occurrence evidences an extent of local disease and of constitutional disorder very perilous, as it is fortunately very unusual.

Time in which cavity is formed.

It is difficult to state the time which it takes for a cavity to form in the lung. In most acute phthisis I have witnessed the occurrence in six weeks from the outset of the disease, and in two months thirteen cases of rapid consumption had reached the third stage. In all of these both lungs were engaged; but the cavity was formed in one side only.

According to my experience* the left lung is gene-

* This experience seems borne out by that of Cotton, Alison, Walshe, and others.

rally found to form a tuberculous cavity more rapidly than the right; and the posterior part of the apex begins to soften before the anterior. The signs of cavity may therefore be frequently detected in the supra-spinous fossa before they are evident in the subclavian region.

Forms more rapidly in left side.

For diagnostic purposes the physical condition is sufficiently marked; for purposes of prognosis the state of the surrounding portions of lung is alone important; and having ascertained the existence of cavity by the usual signs of blowing inspiration and expiration, gurgling on cough, and in certain instances by vocal phenomena of varying intensity (from 'mere resonance' up to perfect pectoriloquy), we should direct our closest attention to the state of the lung *immediately below* these signs, as well as to the other parts of both lungs; for, as far as physical indications can guide us, the future of our patient is to be estimated not by the cavity but by the integrity of the remaining portions of lung tissue on both sides.

Prognosis.

The ordinary process of coalescence of masses of tubercle, while in a state of softening, implies necessarily that the intervening portions of lung have undergone ulcerative absorption or destruction. It is this fact which renders the formation of cavity so perilous. Were each tubercle to soften separately, and the deposit to be much diffused throughout the lung, we should have the disease in a different form, and less urgent in its accompanying systemic disorder. Their aggregation is a necessary condition to the formation of cavity. With great massing, and isolation of the morbid product, although we should expect a large cavity, we may have a residual portion of lung comparatively free. When the former (diffused) condition prevails, and at the same time large masses of tubercle are infiltrated near the apex, we have, on their breaking up, an irregular portion of lung destroyed, without attempt at insulation.

Causes which influence the nature of the cavity formed.

Massing of tubercle.

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Irregular cavity.

Instead of condensed tissue, the product of more or less inflammatory action underneath such a cavity, we have other tubercles less advanced, but still ever ready to undergo destructive changes, which involve a further portion of lung in their disintegration. An irregular anfractuous cavity is the result, often burrowing deep into the pulmonary tissues. This is the ordinary termination of consumption. Not only is there a certain continuity of diseased action from first to last of the case, but there is continuity of the diseased products in the lung, and by mere mechanical extension a spreading ulcer is formed, resembling more those phagedenic affections of the skin, and subjacent cellular tissues, which we so often witness in unhealthy constitutions, than any purely visceral inflammation.

Integrity of the intervening portions of lung. Diffused tubercle.

The integrity of the intervening portions of lung tissue is the measure of the progress of the case. A lung, even extensively infiltrated, but with large portions of healthy, permeable pulmonary tissue intervening, is slow to undergo the softening changes which destroy surrounding parts; and this is the condition, often very chronic, which we have described as 'diffused tubercle.' A lung studded with massed tubercles so near as almost to run into one another, and with a repetition of deposits, is the condition most favourable to the formation of anfractuous irregular cavities; while a single, massed, but isolated deposit in the apex, with the rest of the lung clear, affords the highest probability of forming a circumscribed and tolerated cavity.

Irregular burrowing cavity.

The irregular and burrowing cavity is then the most perilous, as it is the most frequent result of phthisis. Few indeed die of the disease without reaching this stage; and after a close scrutiny of post-mortem records of our hospital, amounting to 556 cases of phthisis, more than 500 were found to have excavations of the irregular cavity, and generally in both lungs. The only exceptions are those comparatively few cases

which died of profuse hæmorrhage or pneumothorax, and a few from extensive consolidation.

May become chronic.

Yet it would be a mistake to suppose that all cases of irregular cavity are rapid in their course. The reason of this may be found in the fact, that their formation is not the work of a single morbid action, or access of disease, but a gradual and repeated extension of the deposit, with renewals of the softening process from time to time, and occasional more or less long remissions of the nature to which attention has been called in the chapter on chronic disease. This, indeed, is their ordinary course; and, were it otherwise, they would belong to the class of acute, or continuous phthisis. Their chronicity depends on a concurrence of the two conditions, a temporary cessation of the systemic disorder which produces tubercle, and of the inflammatory or irritative action in the lung tissue.

Conditions tending to prolongation.

It will be seen that very many of the hospital cases recorded attained a great degree of chronicity. The physical and systemic conditions tending to their prolongation have been already stated. To these must be added the following :—

The absence of secondary complications, as diarrhœa, or severe gastric disorder, indicated by vomiting and persistent gastralgia, with thirst and glazed red tongue.

An average pulse under 90.

The absence of hectic sweating.

If to these be added a highly nutritious diet, warm clothing, good air, and freedom from mental anxiety, we may often be surprised at the length to which such cases wear on.

Yet it need scarcely be said that very many persons treated in hospital practice had but few of the comforts and none of the luxuries of life. Their struggle for existence was made in the face of physical obstacles, deficiency of food, of clothing, and of fuel, and often

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under circumstances of hard labour, of night occupation in over-heated and crowded rooms, and with insufficient sleep in unhealthy chambers! That these are remarkably depressing agents is evidenced by the immediate improvement which all but our most advanced cases undergo on removal into hospital. The remark, which is trite enough, is made to point attention to the fact of how much may be done for even these advanced cases of consumption by ministering all the comforts of life; and how much greater hopes of prolongation may be reasonably offered to patients where all these adjuncts are possible to obtain by money. If we can bear witness to the resistance made to disease under the most depressing outward circumstances, how much more promising are our hopes of prolonged life when affluence can purchase all that the body wants, and often the mental rest from the cares of providing which tell so heavily on the feeble.

Formation of the limited cavity.

It remains to notice the less common form of cavity, that which, limited in extent, is bounded, as it were, by walls of thickened tissues, the result of sub-inflammatory actions which must be considered conservative in their influence. On dissection, the lung tissue is found to be condensed and impermeable below the cavity; the pleura is thickened so as to form a firm cap to the diseased apex, and dense adhesions tie down the lung so that movement is impossible. When excavation is complete, the blood-vessels and bronchial tubes extending across the cavity become shrunken and impervious, and the sac itself is slowly lined with a species of membrane, capable of secretion. As regards the cavity itself this condition is so permanent that even when the patient has perished by new deposits, and more recent excavations in the same and opposite lung, the original provisions for the safety of the individual in the first attack of deposit and excavation remain to attest the conservative resistance made to disease.

It has already been explained that to the production of this form of cavity great massing of the tubercular deposit in one apex, its insulation by condensation of the surrounding tissues, and the comparative freedom of the rest of the lung from disease, are essential conditions.

The right lung the more common seat.

Regarding it as a well-ascertained fact that tubercular disease confined to the apex of the right lung is a more favourable condition for the patient than the same if existing in the left, in what manner shall we account for the difference? As all considerations arising out of the nature of the constitutional disorder, of the kind of tubercle deposited, &c., are excluded by the fact that they apply equally to both lungs, we are forced to look for the cause in the slightly differing anatomical arrangements of the two sides. The division of the right lung into three lobes eminently favours that limiting of the morbid action to a confined space which appears so essential to the attainment of chronicity in cases of cavity. The shorter course, greater size, and higher position of the right bronchus can scarcely be supposed to influence the isolation of a cavity once formed, although such arrangements offer facilities for the exit of its contents.

The influence of anatomical arrangement in limiting the deposit of tubercle in the lung, and also in opposing the coalescence of the several masses in process of softening, is better seen in some of the lower animals than in man. Monkeys often die of tubercular infiltration without softening, and the cretaceous transformation, as also the horny, is more common in the lower animals.* Dr. Houston, in remarking on the insulation of tubercle in the lungs of the axis deer, observes that the result may be probably owing to the more insulated condition

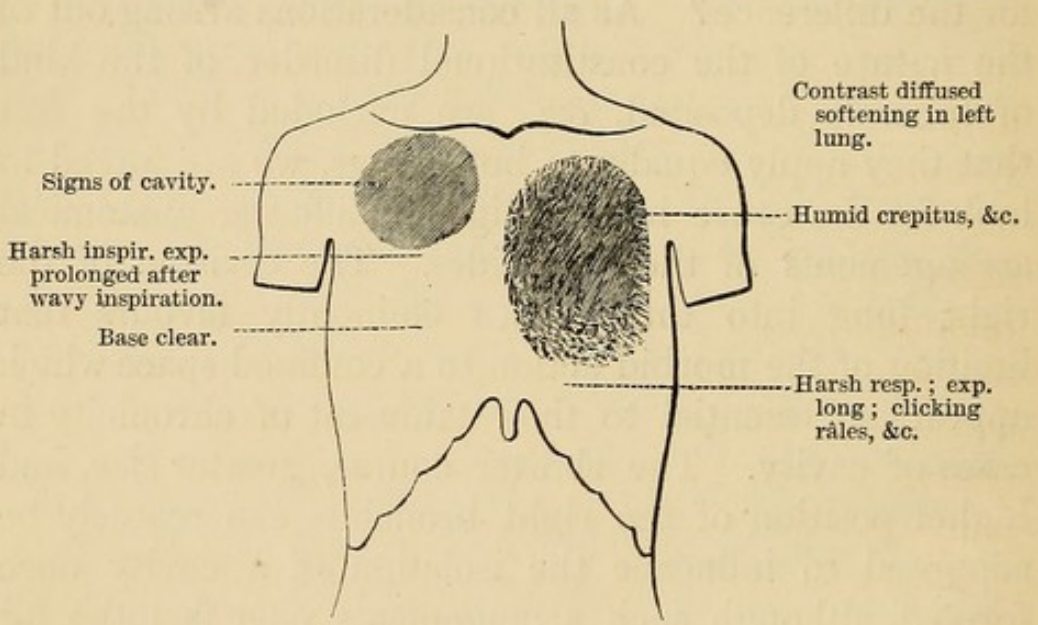
* 'In the lungs of quadrupeds affected with tubercle, cavities are comparatively rare.'—Dr. Crisp: *Trans. of Path. Soc. of London*, vol. xv. p. 256.

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of the clusters of pulmonary vesicles in the lower mammalia than in man. (For an account of several interesting specimens in the Museum of Royal Coll. Surgeons in Ireland see the *Descriptive Catalogue, Pathology*; vol. ii. p. 189; Dublin, 1840.)

Circumscribed cavity described.

The circumscribed cavity, then, is most commonly found in the right apex, where the earliest signs of its existence may generally be observed above the clavicle, or in the supraspinous fossa. After an acute attack of the constitutional disorder already described,



CIRCUMSCRIBED CAVITY IN THE RIGHT LUNG.

wasting, hectic with profuse sweating, and rapid pulse, occasionally a rather copious hæmoptysis may be the earliest lung symptom. Cough speedily follows, and expectoration. At this time the physical signs will be *marked dulness for an inch or two at the apex of one lung, gurgling rough and blowing inspiration and expiration, and resonant voice and cough. These signs are more marked and more concentrated at the apex than they are in the other forms of phthisis. Below them (that is, from above downwards) a simple deficiency or feebleness of the vesicular breathing may be noticed, or well-marked wavy inspiration. Still lower the lung-sounds should be perfectly clear.* The opposite lung should be also clear;

but in some instances much loudness and puerility of the breath-sounds prevails, and may be found to subside when the mischief in the diseased lung has attained its greatest intensity and formed a cavity. In certain instances the unaffected lung expands, and mechanically fills up the obliterated respiratory space on the diseased side.

Temporary crepitant sounds a source of error.

Various sounds, indicative of more active irritation of the lung tissue, may also be present below the aggregated mass of tubercle, or in other parts of the lung. These consist in some modifications of the crepitant sounds, which are not to be relied on as indicative of tubercle softening in these parts, as they will often be found to disappear wholly, and be replaced by pure vesicular murmurs, when the excavation in the apex has been accomplished. They are probably due to irritation of the most minute bronchial tubes, and are referable rather to secretion than to softening. Various sonorous, sibilant, and clicking sounds may precede or accompany them. A diagnosis of their temporary character may be formed from the absence of accompanying dulness on percussion.

Systemic disorder violent.

The violence of the hectic and constitutional disorder in these cases is very great: pulse hard and 120, great heat of skin, chills and even shiverings, with two accesses in the twenty-four hours, and great thirst, mark the intensity of the fever. Nausea, retching with cough, anorexia even to disgust for food, tongue more commonly red than furred, and often irritative diarrhœa, render the gastric symptoms most distressing. The bodily malaise is great; and restlessness by day, irritability of temper, and disturbed nights, ended by morning sweatings and exhaustion, harass the patient. These symptoms are often continuous from the outset; and instances have been witnessed in which there has been no break in the chain of destructive local and constitutional disorder till a cavity was formed.

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May begin by latent deposit.

In their beginnings these cases may have been a chronic and latent deposit long tolerated; or the morbid processes may have had continuity from the earliest deposit up to the formation of cavity. It is hard to obtain evidence about them, for they generally present for medical treatment when softening is setting in with fever; but I have, in a few instances, been able to watch them from first to last. A circumscribed cavity, then, may originate in a chronic localised deposit long latent, or in an acute invasion of tubercle progressing in destructive changes without pause. The former is undoubtedly the most common history.

Fever subsides when cavity has formed.

The characteristic feature of this class of cases is, however, the cessation of fever and constitutional disturbances from the time that a cavity, well bounded and circumscribed, has distinctly formed. Under these circumstances the patient may rapidly recover flesh and strength, the gastric symptoms subside, and the cough become moderate. The expectoration gradually diminishes, and is represented by a morning clearing out of the collected secretion of the night. Alterations of position also cause its expulsion; but the distressing recurrence of cough on moving about is almost absent.

Nutrition improves.

Such individuals often recover strength and flesh with rapid strides, and the processes of sanguification and nutrition seem to have got a new impulse. The blood disorder has, in fact, ceased, and it need scarcely be said that this is a condition essential to the peculiar state now under consideration. The face resumes its colour, the limbs their roundness, and in females the catamenia return. The gastric symptoms also subside, thirst ceases, the tongue returns to a healthy colour, and diarrhœa stops.

Doubtless a time of extreme peril has to be passed during the breaking up of the mass of softened tubercle; but if the local signs be limited to one apex and remain so, and if the patient be well supported, reasonable hopes

of passing safely through this period may be formed by the attendant. The discrimination of such cases requires a practical and reliable knowledge of auscultation, and a tact only to be attained at the bedside. It is not pretended that a true prognosis can be formed at first; for all the features of progressive and fatal phthisis may be present in the earlier stage of the cases we are considering. The lung tissues adjacent to the softening tubercle may exhibit such signs of irritation that the most practised stethoscopist cannot define the limit of tubercular deposit.

Prognosis cannot be formed at first.

It is when the symptoms are subsiding, when the hectic, which is to be regarded as the measure of the lung irritation, is becoming less urgent, that the various sounds of a crepitant, tubular, and sonorous character, spread around the spot where the cavity is being formed, will be found clearing off, and the residual physical condition may, after repeated examinations, be found to consist only in the phenomena referable to a cavity well defined. It is at this period, and not before it, that we can often hold out hopes of prolonged life to the patient who had seemed to hover at the very gates of death.

Subsequent physical conditions.

The physical condition of the chest after some months of improved health is remarkable. There is almost invariably a flattening, more or less marked, of the chest walls, sometimes so great as to amount to deformity. Here the respiratory movements are most imperfect, the chest is tied down by adhesions at the spot, the lung tissue surrounding the cavity is condensed, and, as time advances, contracts in that remarkable way witnessed in our dissections.

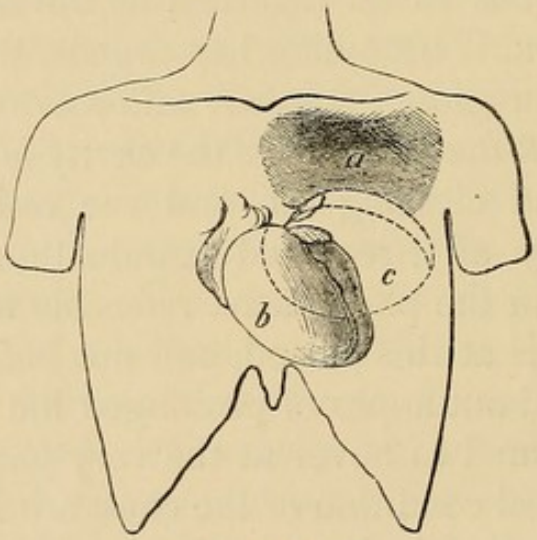
Flattening of chest walls.

Displacement of the heart.

In many of these cases, and even more commonly in instances of non-circumscribed but very chronic cavity in the lung, a remarkable phenomenon of displacement is found. The heart is observed to pulsate close under the cavity, as high as the third, or even the second intercostal space on the left side. In this posi-

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tion the fluid contents of the cavity are often agitated by the systole, and a curious combination of sounds is heard at the spot. In certain cases a systolic murmur is heard, due only to displacement, as after death no valvular lesion is found. The heart may also be thrown high up into the left axilla. Again, it has been seen pulsating high up on the right side, as at the fourth, or even the third, intercostal space—a chronic contracted cavity overlying it. The ordinary costal contraction, due to a former effusion into the right pleura, followed by absorption, may complicate this case; and the phenomena of cavity at the apex, displaced heart, and con-



DISPLACED HEART.

a. Cavity in left apex. *b*. Normal position of heart. *c*. Heart displaced.

tracted side, may all be present together. A thoughtful examination will assist in assigning the physical conditions resulting to their several causes. In all cases of displaced heart not arising from mechanical pressure (from effusion, or from tumour), we find a contraction of the walls of the chest, and diminished pulmonary space. A tuberculous cavity undergoing shrinking, if it be large, almost invariably causes deviation of the heart from its normal position; and were we able to estimate this deviation with accuracy, we should have at once a natural and most valuable test of the relative space occupied by the two lungs. Suspended, as it were,

between two elastic bodies capable of great alterations in volume, the heart is influenced by every change in atmospheric pressure on one side or the other, and is, in fact, a differential pulmometer of extreme delicacy.

Limited flattening of chest walls an indication of chronicity and shrinking of a cavity.

The flattening of the chest walls is also an invariable accompaniment of the shrinking of a cavity, and a measure (when taken with the other compensatory conditions) of the loss of respiratory space. When it occurs it may, if limited in extent to the part of the lung presenting the physical signs of disease, be always taken as a sign of chronicity, and an indication of repair. Of already existing chronicity, for time must elapse before the walls of the chest lose a part of their elasticity ; and of repair, for the shrinking of a cavity is an approach to its diminution and ultimate obliteration. The extensive flattening over a large surface of the chest, seen in all cases of chronic phthisis, is not here alluded to.

Enlargement of healthy lung, a compensating agent.

Another compensating agent in filling up the lost respiratory space is the expansion of the opposite or sound lung. Percussion will often indicate that such extension of the space usually occupied by the healthy lung will take place even to the edge of the sternum on the opposite side. In all cases of puerile or compensatory respiration it may be presumed that a certain expansion of the air vesicles without impairment of their elasticity takes place, and that more breathing in such part of the lung is actually performed. The preservation of the elastic power of a lung so enlarged is its distinguishing character from the emphysematous condition, and is proved by the fact that when such dilatation of the cells occurs in acute inflammation of one side, the healthy lung returns to its normal state and size as soon as resolution of the diseased lung takes place.

This puerility is, however, a rare occurrence in phthisis, and is only observed in chronic cases, where

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the mischief in the diseased lung is limited, and where shrinking of that side has already taken place to some extent. The three compensating agents thus acting to fill up the vacated respiratory space may then be enumerated as—displacement of the heart; partial enlargement of the opposite lung, if healthy; and flattening of the chest walls.

At this flattened spot all or most of the phenomena of a cavity present. Below it we have the usual signs of consolidation more or less complete,—deficiency of respiratory tone, expiration prolonged, and very frequently wavy or interrupted respiration. These signs shade off towards the base.

Prognosis for time favourable.

When, from the history and physical signs concurrently, we can diagnose one of these cases, the prognosis for time can be, and ought to be, favourable; and the miserable error of condemning them to early death is entirely inadmissible. Such instances occur in the practice of all of us, and have led to much disrepute both of the profession and of individual practitioners, who having diagnosed a cavity, proceed to offer a prognosis fatal to the patient's hopes and to their own character for accuracy and practical experience.

Condition of such patients.

The condition of patients who have outlived the formation of a cavity, and in whom the constitutional disorder has ceased, and the local deposit of tubercle been nearly or entirely limited to one apex, is highly interesting. In their appearance there is scarcely any evidence of the almost fatal attack which they have undergone. There is both colour and roundness of feature and of limb. Very frequently the chest is of the anti-phthisical build: so that there is nothing to catch even the skilled medical eye in their appearance, excepting the flattening above alluded to.

Such persons are frequently known to follow the active pursuits of life with ability and vigour. One of my patients in this state, and who has had a large

cavity in the left lung for ten years, is now conducting a National School single-handed. She gives her lessons in an audible tone, and sings occasionally. Another for years was an energetic preacher and a zealous parochial clergyman. The absolute symptoms of remaining disease are, however, evident enough. There is always a certain amount of dyspnœa on exertion. Unless the cavity be absolutely 'dry,' which is very rare, there is always a morning expectoration, although this may be very slight; and there is ever a danger of sudden and possibly profuse hæmoptysis. If the digestion be good (and this appears to be an essential element in the case), sanguification is well performed, and there is a much greater tolerance of cold, and generally less of the chilly state than is common in the consumptive. There is less tolerance of fatigue, and less power of endurance, than in a state of health. The patient lives, in fact, at a lower par than formerly.

Permanent symptoms.

Danger of hæmoptysis.

As his dangers consist in over-exertion of mind or of body, or in any reduction of vital powers, so his safety can alone be insured by leading a tranquil life; by covering the surface with woollen or silk; by living in well-ventilated rooms both by day and night; by daily exercise, on horseback if possible, in pure, dry air; by an abundant supply of good food, and, if possible, by obtaining that mental and bodily invigoration which frequent change of quarters, and travelling in agreeable society, over interesting countries or on long sea-voyages, seldom fail to confer. It would be a mistake to shut up such persons in hot rooms or in a relaxing climate, or to imprison the mouth in a respirator, or the body in a close carriage, as we daily see practised. Their requirements consist in dry, bracing air, and a life free from anxiety; and the more they are kept moving about and agreeably occupied the better.

Dangers and requirements.

I am not prepared to say that a large use of stimulants is always advisable; but I have observed that these

Stimulants.

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cases generally do best on a liberal allowance of wine or beer, which, however, should always be stopped if the pulse gets excited or the skin hot, or if any amount of hæmorrhage threatens. (See the chapter on 'Treatment.')

Terminations of these cases—cure and extension.

The possibility of a cure in these cases, and their termination by extension of disease, remain to be considered.

Possible cure of cavity.

The cure of cavity in the lung has long been a vexed question. I presume there is now no doubt on the minds of the most experienced observers that cavities close and heal up. If the cessation of all the physical signs of such a lesion, and the perfect restoration of health, be considered evidence sufficient, there are cases enough of this kind on record by good authorities to justify the opinion that this form of cure is possible. But all agree that it is not frequent; and its infrequency must be apparent from the fact, that out of an experience of 4530 cases, most carefully noted at the Hospital for Consumption by myself personally, I can only place on record sixty-eight cases of well circumscribed cavity, with thirteen presenting the characters of 'retracted cavity'—in all, *eighty-one instances in which the patients seemed progressing towards a cure of cavity*! For it is quite certain that in order to the closing of a cavity, the conditions which I have assigned to the class called 'circumscribed' must be present; viz., a limit of the deposit to one apex, and a cessation of the constitutional disorder.

Evidence from dissection.

The evidence derived from dissection must be regarded as of the highest importance; and the numerous cicatrices found in the lungs of persons who have died of other diseases can be referred to no other cause than the healing of small cavities. Such direct evidence as I can myself supply is here given in the history of certain of my own cases, and others, from Bennett and Quain, are added. In practice it is of much more import-

ance that our knowledge of the history and progress of the disease should enable us to select with something of accuracy the cases which are susceptible of prolongation and improvement, than that we should offer hopes of a cure which at the best, and under the most favourable circumstances, is an occurrence so rare as to be exceptional.

More important to select cases susceptible of prolongation.

It is of the highest value to a patient to be assured by competent authority, and as a fact founded on most careful observations, that his chances of life are not the nine or eighteen months formerly assigned to phthisis; and it is of the highest value to the physician that the knowledge of the possibility of great prolongation of life in certain forms of consumption should be one of his own assured facts, and should not be thrust upon him as a taunting contradiction of some former ill-omened prophecy of his, but be delivered by him as a prognosis founded on scientific observation. With such knowledge at hand, and a ready tact in selecting his case, he may send many a patient away—not, indeed, with the hope of healing up a cavity in his lung, but with the assurance that life can support such an injury for years, if certain conditions of health be observed.

By conduct on the part of the profession directed by such knowledge, and governed by good sense, we shall cease to regard the healing of the cavity as the object to be accomplished, the chances being so largely against its occurrence; and shall best counteract the empiricism of the day, and most readily put a stop to such practices as are entered on to promote cicatrisation.*

The dangers incident to this class of cases consist in hæmorrhages from the cavity, in the possible occurrence

Dangers incident.

* Such are supposed 'healing,' but really irritating inhalations, the forced blowing of a pipe, supposed to assist the closing of the cavity by causing the distended air-vesicles surrounding it to press its walls together; the inventor forgetting that the forced distention of the lung acts equally on the cavity!! &c. &c.

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of pneumothorax,* and in an extension of disease to the parts surrounding it, or to other portions of the same or of the opposite lung.

Fatal hæmorrhage most rare.

I have never known hæmorrhage to prove fatal from a single cavity; but it is often profuse. Its occurrence may be due to a rupture of some large vessel included in the injured part, or to a breaking up of the cavity with extension of the softening process. A physical examination when the hæmorrhage has subsided will decide the question. If made during the oozing of blood, the soft crepitant sound caused by its effusion into the minute tubes will be a source of error.

Breaking up of the cavity rarely a single process.

The breaking up of such a cavity is very often extremely rapid when it begins, and is rarely, if ever, a single process.

New deposit.

There is always a renewal of the blood disease and constitutional disorder evidenced by fresh deposit of tubercle. The seat of this deposit is rarely immediately beneath the cavity, but most commonly at the base of the same lung or in the opposite apex. The second deposit for a long time evidences the same tendency to slowness as the first; and repeated slight attacks of hectic may be the only systemic indication of its existence, till the recurrence of these leads to a careful examination of the chest, and slight softening is detected. Sometimes a more acute attack ushers in an extensive deposit in the opposite lung, which undergoes its changes with rapidity, and a cavity is speedily formed, the patient's health breaking up.

It is singular how long the original cavity will remain intact as it were, presenting its defined features, and maintaining, with regard to the surrounding tissues of the lung, its insulated character. The patient, in fact,

* In 20 cases of pneumothorax occurring at the hospital, the cavity was single in only three instances. The patients survived the injury respectively 6 hours, 10 days, and 14 days. (See further the chapter on 'Pneumothorax.')

does not die of this original cavity, nor of disease directly extending from it; but from a renewal of the blood disorder, from fresh deposits, and from secondary attacks, as ulcerated bowels, laryngitis, &c.

Analysis of 68 cases of limited cavity.

The following Tables give the most interesting information regarding 68 cases of this form of disease, which came under my own observation at the hospital.

Table showing the ages and sex of 68 *cases of single dry cavity, or 'limited cavity' in one lung.*

Age	Males	Females	Total
Under 10 years	0	1	1
10 to 15 „	2	1	3
15 to 20 „	5	4	9
20 to 25 „	8	9	17
25 to 30 „	9	3	12
30 to 35 „	8	2	10
35 to 40 „	6	2	8
40 to 45 „	5	1	6
45 to 50 „	1	0	1
50 to 55 „	1	0	1
Totals .	45	23	68

Table showing the duration, while under observation, of 68 *cases of 'dry cavity,' or 'limited' cavity in one lung, in both sexes.*

Duration	No. of Cases	Duration	No. of Cases
1 year . . .	9	6 years . . .	2
1½ „ . . .	11	7 „ . . .	1
2 years . . .	9	8 „ . . .	1
2½ „ . . .	7	9 „ . . .	3
3 „ . . .	5	13½ „ . . .	1
3½ „ . . .	4	Indefinite long periods	6
4 „ . . .	2		
5 „ . . .	7	Total .	68

The average duration (while under observation) of each of these cases was 38·90 months; that of ordinary phthisis being 15·22 months. Of course these figures are only approximative; but they convey the fact that this form of disease affords more than double the

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chance of prolongation given by phthisis in its common manifestation.

Analysis of table of 'limited cavity.'

Of the above 68 cases, 50 had the cavity on the right side, and 18 on the left—a very remarkable preponderance. Nearly two-thirds were males.

The greatest number of cases in males occurred between 20 and 45 years of age; and in females between 20 and 25.

In 6 only was any hereditary predisposition to phthisis clearly made out.

Thirty-four had dry cavity, and an equal number had cavity exhibiting the usual moist sounds; but both classes had it in the 'circumscribed' or 'limited' form.

The opposite lung had the physical signs of pht. 1 in 17 instances, and in 1 only the signs of pht. 2.

The preceding affections were few, and had existed in 5 instances only. Two had typhus; rheumatism, gout, and recent rubeola occurred, each in one instance.

One case only died while under observation—a male, at 25, who had been ill for an indefinite period. The cause of death was diarrhœa. No post-mortem examination allowed.

On leaving the hospital 55 were better or stationary; 13 were worse. In 3 the disease in the lung extended while under observation.

In 6 instances only of females within the menstrual age were the catamenia wholly absent; viz.—in 2 for three months, in 2 for six months, and in 2 for years.

Analysis of Dr. Bennett's cases of arrested phthisis.

The following is an analysis of 18 cases given by Bennett* of the arrest or cure of phthisis.

1. Æt. 50, m. Cicatrised cavity; first attack, æt. 22; cretaceous concretions opposite apex.
2. Æt. 28, m. Two contracted cavities in left; cretaceous concretions in right; puckering; emphysema at base.

* *The Pathology and Treatment of Pulmonary Consumption*, by J. H. Bennett, M.D. Edin. 1859.

3. Æt. 19, m. Left lung contracted to size of fist; filled with small cavities lined by a membrane; no recent tubercle; cretaceous concretions at right apex.
4. Æt. 20, m. Cavity right apex, 1842, with pht. 1 at left apex; arrest and complete recovery, 1846; health remains good, 1859.
5. Æt. 15, m. Scrofulous; necrosis of femur; cavity right apex; condensation left apex, cardiac disease, 1849; cicatrisation, 1851; health good, 1853; cavernous blowing, gurgle, &c. were replaced by dry, rather rough respiration, with slight dulness.
6. Hereditary consumption. Æt. 17, m. Softening right apex, consolidation left apex, 1843; complete recovery, 1850; good health, 1859; cretaceous expectoration.
7. Æt. 35, m. Softening right apex, 1843; arrest, 1844; slight emphysema; complete recovery, 1859; dulness and harsh inspiration only remaining.
8. Æt. 22, m. Cavity right apex, 1844; recovery; slight emphysema, 1846; gurgle, pectoriloquy, &c. replaced by dulness; feeble respiration; occasional friction sounds at apex; occasional dyspnœa only symptom.
9. Æt. 22, f. Dulness, mucous râles, bronchophony left apex, 1844; recovery, 1845; no dulness, expiration prolonged (only).
10. Male, æt. —. Cavity left apex, 1840; recovery in 14 months; good health, 1859; no signs of cavity; wore a seton for 9 months. (*This case is well worth studying in detail.*)
11. Æt. 21, m. In 1853 dulness, crepitus, bronchophony right apex; 1857, flattening, dulness, healthy respiration, slight vocal resonance; 1859, good health, active exercise, living in Australia.
12. Æt. 33, m. In 1849, cavity right, cavity also left, (apices); well in 1859; both sides flattened, retracted, dry blowing, harsh sounds, friction murmur, '*lungs cicatrising.*'
13. M. æt. 27. 1854, dulness, crepitus right apex; dulness, bronchophony only, 1859; excellent health.
14. F. æt. 24. Cavity right apex, 1855; dry cavity, contracting, 1859; excellent health.

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15. F. æt. 45. Cavity left apex, 1844; deposit in right apex; ill 4 years; cavity became dry, 1848.
16. F. æt. 30. Cavity left apex, 1842; became dry, health much improved, 1847.
17. M. æt. 24. In 1836 had pht.; remained arrested 19 years, but died of phthisis in 1855 (a drunkard).
18. M. æt. 17. In 1855, cavity right apex; deposit in upper third of left lung; great marasmus. In 1856 cavity became dry, health greatly improved; died in 1859.

It will be remarked that of these eighteen cases, fourteen were *males*; nine of whom had cavity in the *right* lung, and three in the left. *Only four females are in the list*, of whom three had the left lung most affected.

Analysis of Dr. Quain's cases of arrested phthisis.

The following analysis of twelve cases of arrested phthisis, which occurred in the practice of my colleague Dr. Quain, is of the highest interest; the authenticity and accuracy of the reports being insured by the well-known ability of the observer.* The first case is of great importance, as the physical conditions were recognised during life, and traced after death. It furnishes perhaps the most complete history of a case of arrested phthisis which has ever been placed on record:—

Case 1. Arrest of phthisis in the 3rd stage.

M. B., a female, in May 1848, when æt. 13, admitted an out-patient at the Hospital for Consumption. She was suffering from severe cough, wasting, and dyspnœa. She had no predisposition to phthisis, and had not then had hæmoptysis. Her illness began after influenza in the preceding winter. *Decided dulness, bronchophony and bronchial breathing left apex; feeble inspiration, expiration prolonged right apex.* She was treated by oil, small doses of morphia; iodine solution externally. In August she had lost 4 lbs. in weight. *Crepitation over left apex.* In September she had profuse hæmoptysis, followed by large purulent expectoration. *A large cavity then formed* with the usual

* Condensed from the reports in the *Lancet*, 1852, p. 487 et seq. The first case appeared also in the *Trans. Path. Society Lond.*, vol. for 1850–1, p. 50, the specimen having been exhibited at the Society.

physical signs. In June 1849 she had not lost ground. *Loud pectoriloquy, cavernous breathing, gurgling left apex, loud expiratory murmur right.* In August *flattening over left apex; cavernous respiration, but less loud; respiration puerile over right apex;* health began to improve. During the winter 1849-50 she continued the remedies. In October she had scarcely any cough: she is free from suffering of any kind, and has considerably gained in weight. Chest examination shows *remarkable flattening and contraction over left apex, evident dulness and diminished mobility; respiration of a sharp, whiffing character, with slight crepitus. At the opposite side respiration is loudly puerile, and percussion shows the right lung extending across the sternum to the left side. At the summit of the left lung posteriorly, the respiration is scarcely audible; the dulness here is more decided than in front. The heart is seen to beat from between the 2nd to the 4th left costal cartilages.* At the beginning of March she was attacked by influenza, then epidemic; and, singularly enough, had the gastric, and not the pulmonary complication of the disease. After bilious vomiting and diarrhœa for four days, she died.

Post-mortem.

Post-mortem.—Body well proportioned, a fair amount of fat. Right lung very voluminous, and extending across nearly as far as left margin of the sternum. There was no appearance of the left lung in front, but its place was occupied by the heart and pericardium, drawn upwards and to the left side, and by the walls of the apex of the chest falling inwards and downwards. Heart healthy, rather large. Left lung much diminished in size behind the heart; this lung was adherent, especially at the apex, which was covered posteriorly by a mass of solid fibrinous tissue, corresponding to the seat of dulness mentioned. Very nearly the whole of what had been the upper lobe of this lung was occupied by the remains of a cavity irregularly divided into two by a band. The excavation was the size of a walnut: it contained about half a drachm of a whey-like fluid. The walls were formed by condensed pulmonary tissue, in thickness from a line to a quarter of an inch, and in parts puckered and contracted. The air cells and bronchi were distinctly visible, under the microscope, in this tissue, which was separated from the contents of the cavity by a wall or membrane of firm fila-

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mentous tissue and granular cells. The cavity communicated with the left bronchus by an orifice the size of a crow-quill, situated midway between the top and bottom of the cavity. Lower part of this lung nearly healthy. The right lung large; displaced a quantity of water measuring 23 ounces, whilst the left displaced only 9 ounces. The apex was remarkably puckered; on cutting through which the tissue of the lung was found to be traversed by short fibrous bands, between which appeared points of yellow tubercle. A little lower down, in the centre of the upper lobe, a mass of soft tubercle, about the size of a hazel nut, was found. In the other lobes two spots of firm yellow tubercle, and in other two calcareous particles. The remaining organs were healthy. No disease of the intestines; no recent deposit of tubercle anywhere.

Remarkable features of this case.

The leading features of the above case consist in the observed progression of the physical signs, and the corresponding symptoms; the post-mortem appearances confirming every step of the diagnosis and every phase of the history of the case. The increased and compensatory volume of the right lung, the great contraction of the left, the displacement upwards of the heart, and the flattening of the chest walls, are remarkable instances of the mechanical alterations which are necessitated when any amount of pulmonary space has been lost. As a cure of phthisis, both of its local manifestations and of the constitutional disorder, it is a very instructive example. I presume that the tubercle was of the yellow massed variety, which has been described in the chapter on 'Strumous Phthisis.'

The following cases of arrest of phthisis occurred in my own practice. They were chiefly in the third stage, those of the first and second being inserted here to illustrate the nature of the changes in the physical signs :—

2nd stage, arrest.

X., engine-maker, æt. 35. January 1849. No predisp., 8 months ill, no hæmopty., cough, dyspnœa, wasting, *dulness, coarse crep., bronchial voice and resp., left apex.*

Weight 10.5¾. Ordered oil, iod. solut. extern., morphia. In 6 months no cough, health improved, weight 11½, *dulness, flattening, bronchial voice, no crep. left.* In 1852, *flattening, and expiration long, only*; cough very slight, health good.

3rd stage, arrest.

A. B., female, æt. 26. Mother and brother died of pht. Ill 9 months. July 1848, frequent hæmopty., expect. copious, sweats, rapid pulse, ctma. irreg., digestion good, *cavernous resp., coarse crepitus, bronchial voice, right apex.* January 1851, *flattening, dulness, long expiration, vocal resonance, no crepitus,* scarcely coughs, quite well in health.

Cavity drying up; heart displaced; chest flattened.

S. C., female, school-assistant, æt. 20. No predisposition, 3 years ill, cough, sweats, hæmopty., ctma. irreg., *dulness, flattening, cavernous breathing, pectoriloquy, gurgling, left subclav.* After 1 year began to improve (on oil, &c.), *loud creaking, some crepitus, left apex.* In two years, looking well, *flattening left subclav., heart beating to left side at the 2nd intercostal space, no crepitus, a loud creaking sound, chiefly with expiration.* One year later, slight cough, no expectoration, weight increased, health good, *left subclavian space more fallen in, dulness, 'bruit de pôt félè,' heart as before, respiration puerile in right.*

1st stage, arrest.

W. S., tailor, æt. 22. Oct. 1848. 1 uncle, 1 sister, died of pht. Ill 3 months. Cough, hæmopty., wasting, *dulness, bronchial voice, expiration long, right apex.* January 1850, feels quite well, *flattening, no dulness, rather tubular expiration, r. apex.* (I should have classed this among the chronic first stage cases, but the arrest was manifest.)

2nd stage, arrest. Sounds become dry.

R. H., waiter, æt. 26. May 1849. Ill 1 year, worse 4 months. No hæmopty., cough, expectoration, wasting, *dulness, crepitus well marked, right subclav.* After 2 months no cough: perfectly well in 1852, when the signs were *slight dulness, weak inspiratory sound only.*

3rd stage, arrest. Cavity signs disappear.

T. W., lad, æt. 14. June 1849. Mother and 2 sisters died of pht. Ill 1 year; much debility, wasting, purulent expectoration, pulse rapid, dyspnœa, *cavernous resp., coarse moist rhonchus, left apex, harsh resp. and exp. prolonged, right apex.* Sept. 1849, feels well, increased in weight, *no crepitation.* May 1852, flattening both, most left; *inspiratory*

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murmur seems to want penetration, expiratory whiffing. In excellent health, hard worked in open air.

2nd stage, arrest.

F. T., male, æt. 25. August 1850. Uncle and aunt died of phthisis. No hæmopty.; ill 6 months; *dulness, bronchial resp., coarse crepitus, left apex.* In two months *the moist sounds disappeared.* Health improved.

1st stage, arrest.

T. W., male, æt. 40. July 1850. Father died of pht. Ill 4 months; loss of flesh, hæmopty., severe cough, *dulness, feeble resp. right apex, wavy inspiration and dulness left apex.* In 1852 perfectly well, no cough, puerile resp. both apices, right subclav. region flatter.

Cavity contracting; health restored.

M. P., æt. 25, female. June 1848. 1 sister died of pht. Ill nine months; cough, hæmopty., liver enlarged. *Dulness, bronchial resp. right apex.* In October, *gurgling in same space.* July 1859, little cough, scarcely any expectoration, *cavity contracting, dulness, flattening, creaking sounds, some coarse crepitus occasionally, right subclav. Posteriorly cavernous blowing;* left, puerile. March 1852, in perfect health; weight was 7.12, is now 10.8. *Whispered pectoriloquy over a small spot, right apex, flattening under the clavicle; no cough, no symptoms.*

2nd stage, arrest. Complete restoration of health.

M. A. B., æt. 9. Sept. 1848. 1 aunt died of pht. Ill 3 months; cough, wasting, hectic, *dulness and coarse crepitus, left apex.* June 1852, quite well, grown tall and stout; spine curved, the convexity of curve being towards left scapula; *loud puerility left apex, posteriorly, dulness and harsh respiration at extreme apex.* This dulness is most likely the result of 'puckering' of the lung.

Hereditary phthisis. 2nd stage, arrest.

G. C., carpenter, æt. 31. Dec. 1849. His mother and seven brothers and sisters died of phthisis. Ill 1 year; cough, hæmoptysis, wasting, *dulness and coarse crepitus right apex.* May 1852, free from cough, no symptom of illness; *flattening (no crepitus), inspiratory sound weak, expiration long right apex, left puerile.*

Numerical analysis.

A numerical analysis of these cases is not of much value. Of the twelve, seven were males. The left side was affected in six instances, or one half. But in

all which passed beyond the stage of deposit, *the affection was confined to one lung*. Eight out of twelve had a family predisposition to phthisis.

Taking Bennett's and Quain's cases together, we shall find the following figures :

Total, Males	21
„ Females	9
„ Right lung	15
„ Left lung	9

The preponderance of males over females, and of the right side affection over the left, is here very marked.

Males and right side affection preponderate.

The following tables give particulars of the age, sex, and duration of 206 cases of chronic cavity, which occurred in my own practice:—

Table showing the Sex and Age in 206 *Cases of Chronic 3rd Stage.*

Sex and age, pht. 3.

Age	No. of males	No. of females	Totals
Under 10 years	0	2	2
10 to 15 „	1	1	2
15 to 20 „	11	20	31
20 to 25 „	28	16	44
25 to 30 „	25	13	38
30 to 35 „	27	15	42
35 to 40 „	15	9	24
40 to 45 „	12	5	17
45 to 50 „	2	3	5
50 to 55 „	0	0	0
55 to 60 „	1	0	1
Total . .	122	84	206

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Duration, Pht. 3.

Table showing the Duration, while under Observation, of 206 *Cases of Chronic Cavity in the Lung in both Sexes; those which lasted under* 18 *months not included.*

Duration	Males	Females	Totals
2 years . .	2	1	3
2½ „ . .	6	1	7
3 „ . .	15	5	20
3½ „ . .	14	7	21
4 „ . .	6	7	13
4½ „ . .	10	9	19
5 „ . .	7	2	9
5½ „ . .	6	2	8
6 „ . .	7	8	15
7 „ . .	10	3	13
8 „ . .	3	2	5
9 „ . .	0	1	1
10 „ . .	4	2	6
10 to 12 years .	1	4	5
12 to 15 „ .	3	0	3
15 to 20 „ .	1	1	2
21 „ .	1	1	1
Indefinite long periods . .	26	28	55
Totals . .	122	84	206

State on leaving hospital.

Of the above only five died while under observation. All were males. Two had been ill for indefinite long periods; one for three years; one for four and a half years; and one for seven years. The state on leaving the hospital was as follows:

Better	40
Worse, including five dead . . .	73
Stationary	93
Total	206

Average duration of Pht. 3.

The average duration of the disease in this stage from its commencement, and reckoned from the above observations, excluding the 55 ill for indefinite periods, was 66·66 months.* The grand average of all cases of

* An insurance office with large invalid business is in the habit of assigning *two years* as the average expectation of life in cases of limited cavity in one lung.

phthisis being 30 months and three-fifths, this form and stage of disease is seen to attain more than double the duration of ordinary consumption. In other words, when a patient with cavity has passed 18 months, there remains still a reasonable expectation of life, which may be extended for more than four years. For it is to be remembered that these tables do not represent the actual duration of each case to its termination, but only while under observation. I subjoin particulars of some of the more remarkable cases, selected from a great number of notes, taken in all instances in the presence of the patient. The various forms of the third stage of chronic phthisis will thus be sufficiently illustrated:—

Case. Formation of limited cavity, severe hectic; recovery of health, cavity remains dry.

B. T., æt 23, dark hair and eyes, mother died of morbus cordis; one sister d. of hæmoptysis (phthisis). Had undergone much mental harass from altered circumstances and domestic affliction for some months early in 1862. Lost flesh rapidly in February and March, when cough, preceded by a rather profuse hæmoptysis, commenced. In May 1862 had much hectic, pulse hard, 120, excessive chills, and copious morning sweats. Anorexia complete, much nausea, thirst, tongue furred, bowels costive, sleep disturbed by almost continuous cough. In June she began to expectorate copiously, and all the symptoms were at a maximum. *Chest well formed, much dulness to 3rd rib, with gurgle, blowing on inspiration and expiration, increased vocal resonance. The same signs in the supraclavicular and supraspinous regions, right. Below this anteriorly great roughness of inspiratory tone, and expiration prolonged. Remaining parts of both lungs clear.*

This poor girl had been going out in all weathers as a daily governess. Through the kindness of friends she was relieved from this necessity, and all necessary comforts were secured for her, together with perfect rest. During June and July she continued to emaciate with rapidity, and was reduced to a state of extreme weakness; *but the physical signs did not extend to the base of the lung, and the opposite lung was clear.* The treatment adopted was active counter-irritation over the right apex; and the hydrocyanic acid, in effervescence with carbonate of ammonia: morphia

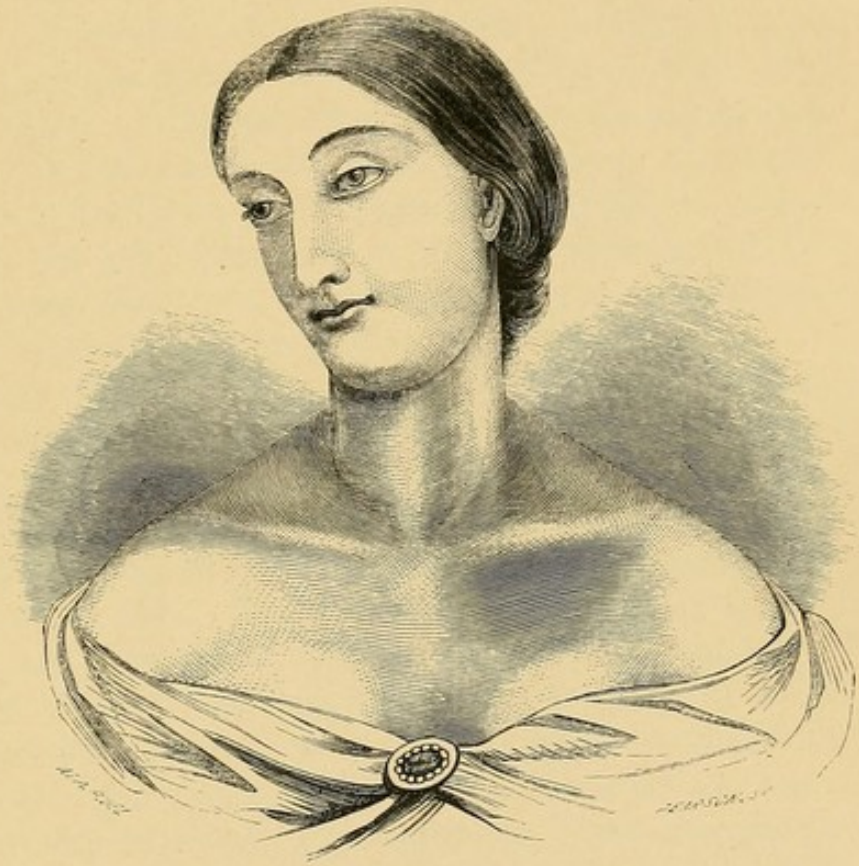
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for cough. Small quantities of nourishment at short intervals. Her exhaustion became so great that wine was ordered about June, and she took three glasses of sherry daily, a quantity which had soon to be doubled. In August she was with great difficulty moved to the country. Her diet, under my directions, consisted at this time of the most concentrated nourishment, given every two hours. Turtle and other soups, eggs, jelly, meat pounded, milk. She took two glasses of brandy and a pint of port daily. I received cheering reports. In May 1863 she called on me in London; and I have rarely been more surprised or gratified. She appeared in perfect health, embonpoint considerable, colour excellent; has had no fever for months, no cough nor expectoration; app. excellent, b. reg., ctm. reg. Chest signs: *flattening of subclavian space, dulness well marked, dry cavernous blowing, imperfect pectoriloquy (no moist sounds), right subclav. as far as third rib, slightly blowing respiration, suprasp. fossa; lung perfectly clear anteriorly and posteriorly below this.*

The following case has been under my own care since 1856, and has been examined repeatedly by the most competent observers :—

Chronic circumscribed cavity in left; health fair; under treatment by oil for ten years.

June, 1856. E. M., æt 15, assists her mother as national schoolmistress, no predisposition, dark hair and eyes. Ill 2 years, constant cough, lately worse, no hæmopty. Ctma. established at 13½, absent one year, returned lately; is growing fast. No present fever, had sweats; app. lately fails; t. dry, whitish. Lately been in-patient; gained 5 lb. in 3 mths. *Much dulness, gurgling, pectoriloquy, flattening slight, cardiac impulse communicated for* 3 *inches subclav. left*; *base clear.* Has taken much oil and iron, with sedatives, for cough. This treatment continued with solut. iod. to the left side. From June to August had slight hæmopty. and frequent diarrhœa, with sweats; but by November had much improved, these symptoms having been checked by acet. plumbi c. opio. At this time *the signs became dryer*, and the expectoration less. She looked well, weight 8.13¼. In December *expiration prolonged right apex*, cough rather more troublesome.



LIMITED CAVITY IN LEFT APEX FOR TEN YEARS; MUCH FLATTENING OF SUBCLAVICULAR SPACE; HEALTH EXCELLENT.

(*Drawn from Life.*)

(See page 218.)

April, 1857: during winter got on well, expectoration moderate, rather gains flesh, and has the aspect of excellent health. Lately appetite fails, and has occasional slight diarrhœa, with thirst. Hæmoptysis 3 weeks ago. *Gurgling for 3 inches, left.* June 1857: has reduced in weight to 8.5; *the physical signs have extended to the posterior part of the apex*; cough increased; vomits. Omit oil. Mist. acid hydrocyanici. August: improved, but occasional diarrhœa, requiring astringents and opium; takes oil pretty constantly. November 1857: improved; weight, 8.13¼; looks well, diarrhœa rarely; *a dry form of crepitation over dull space, right.* With the exception of occasional hæmoptysis, there is not much to record, excepting a gradual improvement in health, *a persistence in the physical signs of cavity in the left apex, and a marked sinking of the chest walls over this spot. The heart is also drawn up, and there is pulsation in the 3rd intercostal space.*

In October 1863 I made the following note:—Cough very slight, scanty morning expectoration, is in good flesh, colour good. Ctma. regular, digestion excellent, no diarrhœa for months. Has had occasional hæmoptysis when overworked. Has the entire management of a National School for the last two years. She comes to the hospital once a month, and has now taken oil for nine years, with only a rare interval when it disagreed. *Great sinking of chest walls left subclav., dulness and dry crackling on cough to 4th rib, faint dry crepitus below this to the anterior base. Blowing and dry crackle in supraspinous fossa, roughness of respiration in base posteriorly. Slight occasional dry crepitation, and some blowing sounds opposite spine of scapula. right.* In July, 1865, she remains in all respects in the same state.

Well defined cavity, very chronic, 13 years

W. P., æt. 36, clerk, no predisp. 13 years ago had hæmoptysis, and was under treatment for 'tubercle in right lung.' Is subject to dyspnœa ever since on exertion. Slight occasional cough with slight expectoration. Complains of deficient circulation in extremities. Is in fair flesh, digestion healthy. *Much dulness, cavernous blowing, very distinct pectoriloquy, bruit de pôt félè under right clavicle to 2nd rib; below this wavy inspn. still lower deficient resp. (as compared with opposite lung).*

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Defined cavity, frequent slight hæmopty., 8 years.

J. H., æt. 42, tailor, no predisp. Hæmoptysis 8 years ago, and frequent, slight ever since. Cough slight, spare but not losing, app. good, b. reg., no fever, diffused chest-pains; *dulness, nearly pectoriloquy, cav. blowing (no moist sds.), subclav. right, rest of lungs clear.* Treated with gallic acid, oil, quinine, and iodine externally. Much improved after 1 year.

Limited cavity, greatly improved health.

W. H., æt. 33, coachman, no predisp. Ill 7 mths. Aphonia some mths., slight cough, hard gristly expectoration, no hæmoptys. In good flesh, but lost ½ stone last month, now 13.2. Digestion good, embonpoint, colour and muscular development excellent, as in perfect health. Dyspnœa lately, *dulness and large gurgle, marked pectoriloquy, apex right side.* Ordered oil, gallic acid, iodine externally. Two months later I find the following note:—Great improvement in health and strength; no sweats, cough better, only when hungry; breath much better; *marked vocal resonance, clicking, and occasional bubble, right subclav. circumscribed.*

Small cavity in apex, profuse hæmopty., not extended after 8 years.

May 1856. H. L., æt. 38, painter (mother d. of phthisis). Ill 1 year, cough slight, increasing expectoration, sweats, dyspnœa, losing flesh. Hæmoptysis ½ pint a day for 3 days, 5 weeks ago. *Cavernous cough and pectoriloquy supra-clav. dexto., below this dry and tubular character of resp.* Pil. conii c. morph., oil, gallic acid, iodine externally. Report six months later: looks very well, cough night and morning only, *tolerated cavity right.* One year later: appearance of excellent health, slight morning cough only; weight 10.2. *Pectoriloquy above clavicle and cavernous blowing, expiration prolonged and insp. rough 2 inches below clavicle, right.*

Oct. 1864. While writing out his case, singularly enough this patient calls at my house. I find *a well-defined cavity in right apex, extending as far as 3rd rib anteriorly, and suprasp. fossa, base clear, tubular blowing left sup-sp. fossa.* General health somewhat impaired, much dyspnœa. *Has slight dilatation cordis, hepatic enlargement,* no fever, is not wasted, has slight cough and daily moderate expectoration. I can thus verify the existence of a cavity for seven years.

Limited cavity before pu-

Jane H., æt. 16, no predisp. Ctma. not appeared. Growing fast, rather gains flesh. Ill 2 years with cough, slight

expectoration. Hæmopty. teacupful 4 months ago; app. good, b. loose, t. clean. Gained in weight, and improved in health at the Bournemouth Convalescent Institution. Has taken oil 8 mths. *Very marked dulness and superficial gurgling for* 3 *inches sub. clav. right, dry wavy inspiration lower down*, much improved under treatment for 4 months. — berty; improving. 2 years.

A. V., æt. 22 (male). Tenor singer. No predisp. Hæmopty. 3 quarts suddenly 3 years ago while singing, and frequent ever since. Cough, but lately very slight, scarcely expectorates, some sweating 3 months ago, and slight diarrhœa occasionally, slightly out of flesh, *small cavity right apex.* — Small cavity, profuse hæmopty. Arrest $3\frac{1}{4}$ years.

Maria M., æt. 24, black hair, eyes dark grey, had typhus 2 years ago, cough ever since, no hæmopty.; expectoration abundant, thick, yellow, teacupful daily; digestion good, b. reg., ctma. reg., no hectic, embonpoint good, gains flesh, *movements very good, no flattening, very superficial cavernous blowing and pectoriloquy with extreme dulness for* 5 *inches left.* Improved on oil for 6 mths. — Cavity in left, after typhus; improvement.

H. C., æt. 25, butcher. Profuse hæmopty. 1 year ago, and frequent since. Cough and abundant expectoration in morning, sweats some mths. ago, no present hectic; app. good, lives well, meat twice a day, $3\frac{1}{2}$ pints of beer, oil taken for 2 mths. Is in good flesh. *Slight arcus senilis. Signs of large cavity in right apex.* — Large cavity, right apex; arcus senilis æt. 25.

A. D., æt. 21, gardener, no predisp. Slight hæmoptysis 18 months ago, after a strain, cough severe for last 4 mths. Expectoration thick, abundant, increasing, losing flesh, sweats, thirst, white tongue, acidity, vomits, anorexia, bowels costive. *Dulness very marked, gurgling, blowing, pectoriloquy right, dulness and feeble respiration apex left.* Ordered oil, alkaline mixture, pil. conii c. morphiæ. He gradually improved, and the note 6 months later was, 'much better, looks in excellent health, works a little, no dyspnœa except on great exertion, a little clear spittle only daily.' *Pectoriloquy as before, a crumpling sound (not gurgling), considerable retractation of chest walls left.* To continue the oil. — Cavity drying; health improved; 2 years.

W. E., æt. 35, engine-driver, no predisposition, still at work, but not on the line. Eight years ago had an attack on the right lung. Hæmoptysis 2 quarts 3 years ago. Cough con- — Chronic circumscribed cavity for

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tinuous, but not severe, with slight expectoration; weighs 10.4, was 12.4. No present fever, app. good, b. reg., improves in health, hoarseness and soreness of larynx last year. *Dulness, pectoriloquy, cavernous blowing to 3rd rib, right, signs well circumscribed. Below this, roughness of resp. and exp. prolonged. Still lower, wavy respn., base clear. Rough r. and exp. long apex left.* Has taken 1 gallon of oil. Ordered iod. potassii, gr. iii. ex. decoct. sarsæ. ter in die, linctus opii, solut. argent. nit. to larynx. One month later humid crepitus replaced the wavy respn. below the cavity. Six months later, friction sounds left base, with extension of disease in right lung, and symptoms much worse.

years. Cavity breaking up. Disease in opposite lung, 8½ years.

Thomas B., æt. 32, comedian; no predisp.; presented Feb. 1857. A spare, low-sized, intelligent man, chest well developed, arms muscular; was accustomed to gymnastic exercises in the circus (as clown) till 9 months ago, where he lost his voice, and with it his engagement at Astley's. Ill for 5 years, with cough and frequent hæmoptysis, and certain amount of dyspnœa on exertion, which, however, did not prevent his extraordinary exertions before the public. Has no present fever; digestion good, app. excellent, leads a strictly temperate life. *Dulness, cavernous blowing, pectoriloquy well marked and circumscribed, left subclavian region.* Ordered oil, linctus opii, solut. iod. to the larynx externally. The uvula was shortened, and a tannin gargle directed. May.—Voice as strong as it ever was; has resumed his occupation as clown, can sing, but by my advice avoids the more violent exercises of the circus (as somersaults). In October went to the north of England, and filled many engagements. In August 1858 I was telegraphed that he was seized with profuse hæmoptysis on the stage at H——. I directed, in reply, frequent doses of acet. plumbi c. opio, and rest, and he resumed his occupation within a month. In May 1859 this well-walled cavity gave way, and a *coarse crepitant sound was evident over the whole left front, while dry blowing respiratory sounds were heard at the right apex.* Yet, in spite of many warnings, he persisted in his professional exertions, only greatly moderating the muscular exercises, and confining himself to the jesting department. In August he was so weak that he fainted more than

Circumscribed cavity, left. Remarkable physical powers; ability to sing. Break up. Duration 10 years.

once; but at the end of the month he again accepted a provincial engagement. In the summer of 1860 he had much improved, and still acted and sung. The expectoration had much increased, and diarrhœa at intervals reduced his strength. Yet, with a full knowledge of his danger, he continued at his occupation. Finally, in 1862, his weakness became extreme, and although in nightly attendance at a theatre in the north, he was so ill as to be scarcely able to stand. Alarmed, at length, by repeated faintings, he hurried up to London by train, and died in my presence two hours after his arrival.*

I am indebted to the kindness of my colleague, Dr. Quain, for the abridged notes of the following case :—

Dr. Quain's case. Signs of cavity form and disappear, oil and alkalies taken for seven years under observation.

May 1850. Mary W., æt. 45; married, 5 children; ill 2 years; cough continuous, and frequent hæmoptysis; *dulness, less mobility, dry creaking and loud voice, right subclav.* Mist. gent. alk., pil. acid. gall. ol. morrhuæ. July: better, coughs up calcareous particles. Oct.: irritative fever, with pain in side. March 1851: *some flattening, right, very loud expiration, still dulness,* expectoration abundant. April 1852: is doing well, but has considerable anxiety; ctma. quite regular, not taking oil for some time, but continues mist. gent.; *flattening, much less dulness, markedly tubular resp. and bronchophony, nearly pectoriloquy (if not absolutely), right apex.* Oct. 1852: uncommonly well, menst. regular, little, if any, cough, regular bowels; *resp. now less loud, right.* Still taking oil and mist. gent. alk. The solution of iodine has been frequently applied. April 1853: doing well, mens. getting less, but regular; breath rather short, *merely loud expiration, now in right, no undue resonance of voice.* April 1854: some return of cough, but general health good; signs same as last year. In 1855-6 her health was not so good. At this time menstruation began to be irregular (her age then was 50–51). In July 1857 I find a final

* I cannot forbear from dwelling on the heroic fortitude of this remarkable man, and can testify to his self-denial and its object. He had a wife and aged mother much dependent on his exertions. I have witnessed his performances at Her Majesty's Theatre, when few would have credited the physical weakness against which he struggled.

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report that she was 'doing well.' The treatment with oil, mist. gent. alk. and sedatives, as also the external application of iodine, had been carried out under Dr. Quain's observation (and occasionally under my own) for seven years.

Case.

The following case was under my care for eight years :—

Phthisis, 3rd stage. Recovery of health after formation of cavity in one year; tolerance for seven years; oil for seven years.

June 1855. L. B., æt. 13; mother died of rapid pht. under my care; father died of phagedenic ulceration of pharynx, extending to the carotid artery. Cough, expect. mod., extreme sweatings for 6 ms. Anemia, and considerable emaciation; digestion good. *Dulness all over anterior and posterior apex, with moist crepitus right. Dulness and slight crepitus subclav. left.* Cod-oil, gallic acid, iodine externally, vinegar sponging. She improved much, but in Decemb. *a cavity formed in right apex.* She greatly regained health after this, and was in good flesh. The cavity was well circumscribed, the base of the lung having cleared up and presenting no crepitant sounds. The moist sounds at the left apex also disappeared. The shape of the chest good, movements excellent, a slight flattening only at right subclav. In Feb. 1857 ctma. appeared. She has had no fever for months, her health is excellent, app. good, has grown much, height 5 feet, weight 7 stone. March 1859: looks in perfect health; weight, 8.2. Phy. signs: *dulness, gurgling, for* 3 *inches, subclav., marked wavy inspiration below this, and expiration prolonged, left. Dulness, gurgle, bronchial resp. and bronchial voice in the superior scapular region for* 6 *inches right side, post. base clear.* At this period this poor girl's life seemed capable of indefinite prolongation. She proposed to marry, but I dissuaded her from this step. She was apprenticed to a dressmaker, contrary to my advice. Her chest symptoms were limited to dyspnœa on exertion, and slight morning cough, and she appeared to be in perfect health. She continued to take oil constantly. In 1862, towards winter, she began to break up. In January 1863, vomiting, diarrhœa, and sweats set in. The barrier below the cavity broke up, and crepitant sounds replaced the wavy. The opposite apex also again became crepitant. She emaciated rapidly, and died in March 1863. *Duration of case, eight years and three months.*

Remarks.

This case is a good example of the improvement in health which often occurs after the formation of cavity. The blood disease appeared exhausted for the time, and a remarkable toleration of the local mischief occurred. The evidence of circumscription of the cavity was well marked, and the alteration of the moist sounds in the opposite lung to respiration, only harsh, was very remarkable. At the break up this lung became again crepitant, showing a renewal of the destructive process. We cannot doubt that had the constitutional disorder not been reinduced by the close confinement and other pernicious influences to which she was exposed, this patient might have lived for many years. As it was, the prolongation for more than eight years was remarkable, and the conditions under which it occurred most worthy of note.

Case. Origin in acute attack. 2nd stage, two years. Cavity in 5th year. Dries and retracts in two years. Much oil.

March 1859. Ch. H., æt. 26, m., shopkeeper. No predisp.; cough for three years; no hæmopty.; expect. slight; no present fever; marasmus 2, not losing; digestion fair; had inflammation of right side in Nov. last. *Great dulness and deficiency of resp. from scapula down; also in axilla and from 5th rib to base anteriorly. Humid crackle subclav. and much vocal resonance sup-sp. fossa right: measurements equal.* Ordered oil, quinine and iron, linctus opii, iodine externally to right. Improved much by going out of town, and was in tolerable health till Dec. 1861, at which time *a cavity formed in right apex*, and a pleuritic attack same side induced considerable effusion. This was treated by iodine, cod-liver oil, and counter-irritation, and was partially absorbed, but *dulness and absolute nullity of respiration remained at the base all round.* In March 1862 the base anteriorly presented crepitation, but he was in good general health; no cough, app. excellent, walks long distances daily, lives well, still taking oil, able to follow his employment.

Oct. 1863. *Dry, wavy, blowing inspiration and exp. for some inches under clavicle. No moist sounds (where formerly gurgling), retraction of chest walls, dulness for some*

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inches subclav. The base is dull, and respn. deft. as formerly, right. Scarcely ever expectorates; no cough; leads an active life; gain of weight. In December 1863 some pain in left base, *with very slight dry wavy sound (probably pleural)*. Health unimpaired. Duration 7 years; under observation 4 years. Oil was taken for nearly the whole period, and counter-irritation repeatedly used. He goes annually out of town in summer, and lives well, carrying on a large business.

Case. Passage from 1st to 3rd stage, with signs of cavity disappearing. Oil for four years.

M. W., f., æt. 45, married, 5 ch. No predisp. May 1850. Ill 2 years; cough; frequent sl. hæmopty.; *dulness, less mobility, dry, creaking, loud voice, right.* Ordered oil and mist. alkal. gent.—March 1851. *Some flattening, very loud expiration, dulness.*—August. *Rough crepitation, loud expiration*; some cough; general health fair.—April 1852. Doing well; ctma. reg.; in fair flesh. *Flattening, much less dulness, resp. very tubular; cavernous blowing and pectoriloquy, right.*—Oct. 1852. Uncommonly well; little cough, if any.—April 1853. *Doing well; mens. ceasing; more dyspnœa; merely loud expiration, now in right front; no vocal resonance.*—April 1854. Still doing well; taking oil; ctma. irregular; occasional dyspnœa the only symptom. Phy. signs as last.

Chronic cavity, left; good health; $5\frac{3}{4}$ years.

Emily K., æt. 22. No predisposition. Hair and eyes dark. Cough for 5 years, constant, but slight, with moderate expectoration. One slight hæmopty. some mths. ago. Is in good flesh; weight, 8.1. App. and digestion good. Ctma. reg. *Small superficial cavity in left apex.* Under treatment for 9 mths.; took oil for that period. Had scarcely any cough; very slight expectoration. General health excellent.

Tolerated cavity; ability for hard work; robust health; duration 21 months.

W. B., labourer, æt. 28. No predisp. Cough, 14 months; expectoration abundant, green, dark. Hæmoptysis slight, 9 weeks ago. Sweats lately; loses flesh; reduced from 14 stone to 13. *Dulness, coarse crepitus, pectoriloquy, left apex. Rest of both lungs clear.* Oil and solut. iod. externally. Seven months later, in November, I find the following note:—'No cough nor expectoration since July. No hæmoptysis. Is now in perfect health; works hard, chiefly at sewers, and is much exposed to wet. Lives well; drinks plenty of ale, rarely spirits. Has no fever, is robust

in appearance, weighs 11.8¾. Phy. signs: *marked crepitus and loud vocal resonance over left apex.*'

I am permitted to mention the following cases on very high medical authority :—

Single cavity in right apex 27 years ago; person still living.

A. B., æt. 72. Her mother, two brothers, and one sister died of phthisis. In 1837 Dr. Williams and others ascertained that she had a well-marked single cavity in the right apex. She has now no cough, is in very good general health, and lately made a long journey without discomfort. There are no existing signs of cavity (December 1864).

Cavity; displaced heart; two years.

C. D., f., æt. 15. Ill 2 years. No predisp. *Large dry cavity in left apex. Heart beating in left axilla.* Health improving; gained 5 lbs. in 3 mths. (*Dr. Cotton, Ward K, p.* 423, *Case Book.*)

Cavity right. Heart displaced to second right intercostal space. Six years.

C. T., f., æt. 27. No predisp. Dark hair; fingers clubbed. Ill about 5 years with cough and dyspnœa, much increased last 3 years, with pain in right. *Cavity right apex. Cardiac pulsations evident to sight and touch between 2nd and 3rd ribs of right side. Clear sound on percussion over the usual cardiac region. Circumscribed crepitation at angle, right scapula. Six months later right base became crepitant. Right b. measures about half an inch less at the nipple. Eventually a cavity formed at left apex,* when she sunk in the 6th year of her illness. This patient was long under observation in the hospital, having been three times an in-patient. Post-mortem examination confirmed the relative position of parts as above stated. (*Dr. Cursham, Montgomery Ward, p.* 220, *Case Book.*)

Cavity right; displaced heart.

M. A. H., female, æt. 8, small precocious child; f. died of pht. Ill 2 years since a severe attack of measles. *Right side much shrunken. Cavity in apex. Heart dislocated, apex beating between 5th and 6th ribs to right of sternum.* Death from hæmoptysis. (*Dr. Cursham, Montgomery Ward, Case Book, p.* 87.)

The following case, for which I am indebted to my colleague, Dr. Cotton, is a good example of the cure of tubercle, resulting in obliteration of cavity and puckering of the lung :—

J. N., æt. 36, a Greenwich fisherman, admitted to Ward

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Evidence of healed-up cavity; death from diseased heart and kidney.

No. 5, Sept. 5, 1864, complaining of dyspnœa, short cough, and wasting. *A systolic murmur was present at the ensiform cartilage. Slight creaking sounds were noticed at the apex of the right side.* Excessive albuminuria, with large and small granular casts. Extreme anasarca; prostration. The mother of the patient volunteered the information that he had been reported to be in a consumption by the doctors 7 or 8 years ago; that he had spat blood, and been much out of flesh, but that 'he had got well again.' He died on Sept. 16th. Post-mortem appearances:—Lungs: *right almost universally adherent; adhesions old and firm, especially at apex. This lung is very dense at the summit for about the size of a large walnut, with much puckering at the top and back. On cutting into it, there are dense, white, fibrous-looking cicatrices, and one cheesy mass the size of a split pea.* The left lung presents similar appearances to the right, excepting that the thickening and contraction at apex are much more marked. *The cicatrix of former cavity, the size of a chestnut, is well seen.* There is much old tubercle around it, and a few grey miliary tubercles rather lower down in the lung. In the heart was observed insufficiency of the aortic and tricuspid valves and dilatation of the right ventricle. Atheromatous degeneration of the aorta.

Summary of good prognostics.

The prognostics in the third stage of phthisis are to be derived from a most careful study of the history and symptoms of our patient, always in conjunction with the physical signs. The following summary may assist:—

Good prognostics derived from personal history.

1. Family antecedents not phthisical.
2. The male sex.
3. Age not under 20.

Good prognostics derived from the physical state of the lungs.

Supposing a cavity to have formed, to afford a reasonable hope of its becoming tolerated it should be—

1. Confined to one lung—the apex.
2. The right lung is more favourable, especially in males

3. The physical signs should be accumulated in one spot of limited extent.
4. The physical signs should be well marked and well defined; that is, the more evidence there is of a perfect excavation, from percussion, breath, cough, and voice sounds, the better; and there should be an abrupt limit of these signs at the lower edge of the cavity.
5. The cavity should be of moderate size, with the physical signs included in 3 and 4, and not extending to other parts of the lung; while fever is continuous, and the constitutional disturbance intense, a very guarded prognosis should be offered, always, however, holding in reserve the possibility of such a case becoming one of *limited* and *tolerated* cavity. On the cessation of the constitutional disturbance, the further favourable prognostics are—
6. A gradual flattening of the subclavicular space, the other parts of the chest retaining their mobility.
7. Alteration of the heart's position.
8. An expansion of the opposite lung to fill up the pulmonary space lost by the shrinking cavity.
9. The absolute immunity from disease of other parts of the same lung, or of the opposite.
10. The cavity sounds become more dry.
11. The absolute cessation of gurgling.
12. The substitution of leathery creaking sounds.
13. A diminution of the area over which the phenomena of cavity are heard.
14. The ultimate permanence of dulness, fixity, retractation of chest walls, and blowing sounds with prolonged expiration, as the only phenomena.

The favourable prognostics derivable from symptoms are inseparable from those furnished by the physical

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signs, and by the progressive character of these latter. They consist in—

1. The subsidence of all the constitutional symptoms—hectic, waste, and secondary gastric disorder—soon after the formation of a cavity in the lung.
2. A quiet pulse.
3. Diminished cough, and lessened expectoration, moderated dyspnœa, absence of local pain.
4. The absence of the secondary complications of phthisis, diarrhœa, laryngitis, &c.
5. The gradual restoration of the processes of nutrition, improved appetite, gain of flesh, improved colour of face, lips and tongue, and nails.
6. Improved nervous power, evidenced in subsidence of irritability, more tranquil sleep, less anxiety, and revived hopes.
7. The restoration or gradually improved regularity of the catamenial functions in females.

The continuance of the stage of toleration is evidenced by—

1. An habitually quiet pulse.
2. The absence of sweating.
3. No hæmoptysis (or its rare occurrence).
4. The integrity of the digestive system, in its primary and secondary processes.
5. A maintained average of weight, lower than the mean of health, but never rapidly sinking.

The possibility of obtaining the requirements for a maintenance of this state of toleration, viz.:—

1. Freedom from anxiety, whether that due to precariousness of the means of providing the necessaries of life, or to grave concerns for the patient or his dependents.

2. Abundance of the comforts of life.
3. Pure air, well-ventilated apartments, exercise.
4. The absence of the sedentary occupations, or of those of a generally unhealthy character, and especially of that which appeared to act as a promoting cause of the disease in its beginning.

Other forms of chronic cavity.

It is not pretended that a considerable degree of chronicity may not be, in certain instances, attained by individuals with other forms of cavity in the lung than that above described as of the limited or circumscribed variety. The irregular or (as it has been called) the anfractuous cavity, while its very character indicates a small amount of surrounding healthy lung tissue, may differ from the circumscribed form only in its configuration, and in its history and progress may possess many of the features above designated.

The anfractuous.

But, on the other hand, it must be acknowledged that the ordinary form or type of continuous and destructive phthisis is that which, from a breaking up of contiguous masses of tubercle thickly scattered through the lung, forms a chain of irregularly connected cavities, which burrow deeply into the pulmonary tissues, and present all the symptoms due to congestion and irritation of the lung itself. The anfractuous cavity, or chain of cavities, stands intermediate between the two leading varieties of phthisis, which we have designated as 'diffused tubercle' and 'limited cavity;' and as it is eminently destructive in its progress, so is it opposed to the probability of a maintenance of any considerable residual portion of healthy lung to permit of the processes of respiration being sufficiently carried on to support life.

There are, however, a number of cases of the third stage of phthisis, met with in practice, which last an incredible time, although not belonging to the class of limited excavations in one lung.

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Observations made on large numbers of these cases seem to warrant their division into two classes.

1. Cases of two pretty well defined cavities, one in each lung, the bases remaining clear.
2. A series of irregular cavities in one lung, often extending to the very base ; the opposite lung presenting only the signs of a limited deposit in the first or second stage.

Double cavities.

Of the fact of persons with two * cavities often surviving such disease for years there can be no doubt. Two periods of excessive danger have been passed ; and the assumption must be that, when the hectic and constitutional disorder attending the formation of the second cavity have subsided, the patient is left even then with sufficient respiratory space for the lowered requirements of the system. These cases are

Rare.

so rare as to be almost anomalous ; and they evidence a more than usual vitality, a great power of sanguification ; and are never found coexisting with any permanent and serious derangement of the digestive

Requirements.

processes. I have only met with instances of much prolongation of life in cases of this kind among the higher classes, where every requirement of health, abundant and varied nourishment, frequent changes of air, and prompt medical help when complications arose, afford the fairest chances of assisting in the struggle for existence made against great odds. With these

Prognosis.

requirements fulfilled, a fair prognosis for time may be offered.

Irregular cavities, with disease of opposite lung. Description of.

A series of irregular cavities in one lung, with a slight amount of disease in the opposite, and much prolongation of life, is not uncommonly met with. In these patients

* Dr. Copland mentions a case of phthisis which 'had evidently been of forty-four years' duration'—death from hæmorrhage. Several lined cavities in both lungs, with fibro-cartilaginous walls, and two so much reduced as to be almost cicatrised.— *Copland on Consumption.* Lond. 1861. p. 67.

life is sustained at the lowest possible level. The emaciation is very great; but the patient never loses much flesh, and never gains any. The respiratory requirements of the system are at their lowest; and badly-aerated blood is constantly circulating, as shown by the peach-like colour of the cheeks, the partial lividity of lips, and the colour of the nails. There is no better test of the state of the capillary circulation than the nail and the parts surrounding its root. If pressure does not give a rosy colour, or effect much alteration in that already existing, there is much capillary stagnation; and the nutritive processes, and chemical vital changes carried on in the terminal part of the circulation, may be presumed to be very feeble and imperfect.

Physical conditions.

The condition of the lung is shown by the tubular blowing breath and voice sounds prevailing irregularly over large portions of it; and we know from dissection that a chain of irregular cavities is often formed from apex to base. The opposite side may present crepitant sounds over a third or a half of its extent, and all this local mischief may coexist with quiet pulse, and a tolerable integrity of digestion and of the functions of life continued till the break-up occurs suddenly. A great fixity of the chest and great flattening of the anterior walls is always manifest. The side most affected will appear scarcely to move. The flattening is not limited to one subclavicular space, as in the former variety; but is diffused. It is due to atrophy and contraction of the lung, and loss of respiratory space. In these cases the heart is rarely displaced; and the opposite lung, being diseased, is incapable of expansion. The threatened atmospheric vacuum is therefore compensated by sinking of the chest walls above. The decubitus of the patient is commonly on the back, or with the head inclined towards the least affected side; the occurrence of cough and dyspnœa preventing any other posture.

Vital conditions.

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Dangers.

The dangers incident to this condition are—

1. Congestion of the remaining portion of sound lung, which annihilates the remaining respiratory space.
2. Sudden hæmoptysis, which, if profuse, fills up the tubes, and causes instant death.

But the termination may be by slow emaciation, and exhaustion painfully prolonged.

It is obvious that this class of cases owes its continuous character to the small requirements of the system for respiration, and to the possibility of sustaining the patient with the fewest possible demands on his strength.

*Digital Clubbing.**

Clubbed fingers most common in 3rd stage.

The peculiar condition of the ends of the fingers which occurs in many cases of advanced phthisis may be best considered here, as it undoubtedly is attached more to the third than to either of the other two stages of tubercular disease.

Authorities.

Such authorities as have recorded their observations on this subject have agreed that the condition termed clubbing is found almost exclusively associated with phthisis. M. Rigaud † finds that this sign was present in many non-phthisical cases; and those which he cites are instances in which certain peculiar trades caused the appearance, as burnishers, polishers, workers at sewing machines, &c.; but these instances have so obviously a mechanical origin that they may be dismissed at once from all consideration. More worthy of notice is his statement that this sign was absent in 135 out of 179 cases of phthisis.

Rigaud.

Trousseau.

The opinions of Trousseau ‡ are of more value. He

* See Frontispiece.

† *Gazette Hebdom. de Méd. et Chir.*, April 11, 1862.

‡ *Journal de Méd. et Chir.*, Nov. 16, 1862.

considers this condition to be due to hypertrophy of the bone and fibrocellular tissue; and ascribes it to the second and third stages of phthisis, and to chronic pleurisy in young subjects. According to this authority it is not found in scrofula. He has noticed it in cyanosis occasionally, in which cases it is referable to non-arterialisation of blood. My colleague, Dr. Quain, informs me that he has seen a most marked instance of clubbed fingers in a case which occurred at University College Hospital, and in which the only abnormal condition found after death was universal adhesion of the pericardium. The lungs were free from tubercle.

Author's experience.

My own experience would nearly limit this condition to phthisis of a very chronic character; and generally to the second and third stages of phthisis, with a large preponderance of the latter. There may be exceptional instances of its occurrence in other affections; but they are very rare, and the clubbed shape is generally not perfect.

Sign highly valuable for prognosis.

A few cardiac cases and chronic pleurisy form these exceptions. The condition is not only almost peculiar to phthisis, but, what is infinitely more important, to very chronic phthisis: and it is as an element of prognosis rather than of diagnosis that the sign becomes of value. Wherever this tendency is well marked, long duration and toleration of disease may be looked for; and wherever the condition is thoroughly developed, phthisis, possibly in a latent form, has been present for years.

Is associated with cavities.

I have further observed that the condition is almost peculiar to the species of tubercular disease in which cavities are formed, as distinguished from that in which there is a deposit diffused throughout the lungs without tendency to aggregation. In forty-six cases under my care which presented this peculiarity, only four had 'diffused tubercle.' On the other hand, it is scarcely ever seen in cases of circumscribed single cavity.

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Rare in single circumscribed cavity.

In thirty instances the patients were in the third stage (cavity), fifteen were in the second, and only one in the first stage.

Sex has slight influence.

Sex appeared to have little influence, as the numbers were 24 males to 22 females; but females exhibited the conditions at an earlier age than males.

Age.

The following table shows these observations:—

Age	Males	Females	Total
Under 10 yrs.	1	3	4
„ 15 „	1	2	3
„ 20 „	4	3	7
„ 25 „	3	4	7
„ 30 „	6	5	11
„ 35 „	2	2	4
„ 40 „	5	3	8
„ 45 „	1	0	1
„ 55 „	1	0	1
	24	22	46

Complications.

The non-phthisical complications in these cases were few:

Fistula	1
External struma	3
Morbus cordis	2
Rheumatism	1
Pleurisy	2

More important is the duration. In endeavouring to ascertain this, we were met by the difficulty which in very chronic affections attends on an investigation of the earliest symptoms. The cases which remained thus obscure as to their early history were among the most prolonged of all, and have a value in estimating the character of disease. They are marked 'indefinite periods' in the following table:—

Duration.	No. of cases.	Duration.	No. of cases.
1 year	2	7 years	1
2 years	6	9 „	1
3 „	11	12 „	1
4 „	4	Chronic indefinite	15
5 „	3		—
6 „	2		46

The average duration to be assigned to each case from the above table is 45·67 months (not including indefinites).

Average duration.

It will thus be seen that digital clubbing implies prolonged toleration of disease. These cases, when examined on leaving, were found as follows :—

State on leaving hospital.

Better	3
Worse	22
Stationary	21

It is to be remembered that, as the tables are calculated from the duration while under observation, a much longer term than that marked must really be assigned to them.

Through the kindness of Mr. Edwards, the valuable Resident Medical Officer of the Hospital for Consumption, and whose experience extends now over many years, I am enabled to give the following table of observations, which is formed from probably the largest numbers ever collected :—

Mr. Edwards' tables.

	Clubbed	Per cent.		Not clubbed	Per cent.
Males	404	29·12	Males	983	70·87
Females	250	23·96	Females	793	76·03
Totals .	654	26·91		1,776	73·08

Notes as to clubbed fingers were made in males 1,387, females 1,043 ; total 2,430.

Patients whose fingers were decidedly 'clubbed' are a little above 29 per cent. in males, and not quite 24 per cent. in females ; a difference on the male side of a trifle over 5 per cent.

The total 'clubbed' of both sexes was nearly 27 per cent. against those 'not clubbed' of 73 per cent.

Clubbing belongs to chronic phthisis.

In reviewing such facts, and studying the cases, we are led to the conclusion that this peculiar condition, which has been noticed in all ages from Hippocrates, attaches itself very exclusively to chronic phthisis.

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Its cause.

It is never seen in incipient stages of tubercular disease, nor does it occur in the more acute forms of phthisis. To what then is it due? We believe that its cause will be found in an altered and much lowered condition of nutrition, evidenced at the terminal parts of the circulation.

Appearances.

The appearances are due to two conditions: hypertrophy, causing expansion both of the bone and of the fibrocellular soft parts, and also to absorption of the pulpy parts underlying the nail; for incurvation of the nails is always conjoined with the former condition. A great stagnation of the circulation may be noticed, and is evidenced by the lividity of these parts.

Evidence of non-arterialisation and imperfect nutrition.

Under the influence of great venosity, the result of imperfect arterialisation in the lungs, the capillary changes are imperfectly performed, the nutrition of the part is impaired, and a loose, spongy, and ill-compacted tissue is produced, instead of healthy structure. That the whole capillary circulation of the body is in a similar state in very chronic phthisis, with great destruction of respiratory space, is highly probable; and we can have no better evidence of the condition of the terminal portion of the vascular system than in the parts underlying and surrounding the nails. The phthisical patient, in very advanced stages of the disease, is living at a lower respiratory average than would be consistent with health. As in hybernating animals, his production of heat and the activity of the capillary circulation are greatly diminished; the nutritive processes are proportionately lowered; and, if the individual is at the growing age, normal growth is stopped. When new tissues are to be formed, or old ones sustained in the daily loss and renewal of structure, the processes of nutrition are scantily performed, and their products are of lower vitality. In a word, we believe that this abnormal tissue about the bone is only one specimen of what is going on all over the

body, and illustrates the formation of a low quality of tissue out of partially arterialised blood. In such individuals the colour of the face and of the lips is generally dusky, and evidences the admixture of venous blood in the circulation.

The cases, apparently exceptional, in which I have witnessed clubbing in even a slight degree without manifest phthisis, have been instances of chronic pleurisy, empyema undergoing absorption, and chronic cardiac affections.

Found in phthisis with valvular disease.

In phthisis combined with diseases of the heart (obstructive—valvular affections chiefly) it occurs very frequently.

The following instance of cancer in the lung and mediastinum, with old calcareous concretions in the lung, and puckering at the apex, was accompanied by very marked digital clubbing; but the signs of old tubercle will probably, to many readers, account for the state of the fingers :—

Case. Cancerous tumour of lung and mediastinum, with old cicatrices and concretions in the lung. Fingers clubbed.

C. L.,* æt. 54, admitted into the Hosp. for Consumption, under Dr. Pollock's care, August 8, 1862. No known predisposition to tubercular or cancerous disease. Had gout four years ago, and has been out of health ever since. Hæmoptysis 16 weeks ago, since then persistent cough and increasing dyspnœa, with latterly severe lancinating pain through the left chest. Expectoration moderate, viscid, prune colour. Slight loss of flesh. He is a stout, well-built man. Face congested, bloated, of a dark venous colour. *The fingers are markedly clubbed.* Decubitus partially on the left side, with head low. Right pupil is larger than the left; the right radial pulse fuller than the left. *Chest movements on left nearly lost; external chest veins enlarged, and more so on the left. Left absolutely dull all over front to the base, dulness extending across the upper two-thirds of the sternum and the lower third. Complete absence of respiration over the dull part. Pos-*

* Abridged from the *Path. Transactions*, vol. xiv. p. 19.

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teriorly in supraspinous fossa bronchial respiration and bronchial voice. Very tubular respiration along spine, with increase of vocal fremitus. Slight moist crepitation, extreme base, posteriorly. Respiration puerile on right, and very rough. His natural voice had been a deep bass; he now spoke in a high treble. No dyspnœa; excessive tenderness over left chest. In about a week slight prominence of the chest walls was manifest at the 2nd and 3rd ribs. This was hard and exquisitely tender, and the centre of the lancinating pains from which he suffered. The diagnosis of a cancerous mass, occupying the mediastinum and encroaching on the left lung, was recorded at the first visit, and the progress of the case only verified this opinion. He died exhausted on October 15. There had never been excessive dyspnœa. The left radial pulse became imperceptible before the right. *Post-mortem appearances* 30 hours after death:—Left pleura contains a large quantity of fluid; it is firmly adherent to the lung. A cancerous growth is seen in the posterior mediastinum, adherent to the vertebræ, as low down as the last dorsal, and extending upwards along the neck. It presses on the left lung, and surrounds the various structures at the root of the lung, and is continuous anteriorly with the external tumour. Left lung compressed to the size of an orange, is infiltrated in its upper third with cancerous matter. Left bronchus nearly obliterated; left pulmonary artery much narrowed; arch of the aorta not pressed upon. The right lung is of average size. In the lower lobe are two cancerous deposits, white, cerebriform, and possessing the usual microscopical appearances of cancer. A puckering of the lung is seen on its surface in the lower lobe, and on cutting into it there is a small cretified mass. There are two cicatrices at the apex of this lung; no recent tubercle. One of the bronchial glands at the root of this lung is converted into a cretaceous mass. Heart, liver, and kidneys healthy. The external tumour, when microscopically examined, appears to be cancerous.

In the above case the two diseases of cancer and tubercle were undoubtedly combined; and the tubercular seems to have been superseded by the malignant disease.

M. Cordis. Phthisis 1. Clubbed fingers.

James S., æt. 39, keeps a beer-shop. No predisposition to phthisis. Rheumatic fever some years ago. Cough many months; hard, dry, till last month, when he expectorated matter mixed with blood. Night-sweats. Weighed 12.6; is now 11 stone. Digestion impaired, urine loaded, t. furred, colour sallow; has probably drunk much beer. *The fingers are much clubbed. Rough aortic systolic murmur. Expiration long, cough impulsive, wavy rough inspiration, with dulness on percussion for some inches right.* Improved at first on taraxacum and nitric acid, with the ext. acet. colchici and aloes. Later on, the cardiac symptoms increased, and he was confined to the house.

Very chronic double phthisis 3, 12 years.

Catherine H., æt. 18. One aunt died of phthisis. Ill 12 years, ever since an attack of pertussis. Has constant cough, streaky hæmoptysis. Digestion good. Ctma. not appeared. No fever present. Hair and eyes dark; colour rosy; not much out of flesh. *The usual signs of irregular cavities in both lungs.* She cannot take oil; improved on effervescents with hydrocyanic acid and light wines. The catamenia appeared some months later, and continued regular. She became an in-patient for three months, but did not gain weight. *Her fingers are much clubbed.*

Phthisis 2. Digital clubbing

Eliza L., æt. 30, widow. No predisposition. A profuse hæmoptysis 8½ years ago, followed by a cough, which has been continuous ever since. The hæmoptysis has frequently been repeated, the last three weeks ago. The cough is now only on lying down and on rising, with slight expectoration; on some days none at all. She had much hectic at the beginning of her illness, marked by profuse sweating. Pulse now quiet. She is only slightly wasted. *Her fingers are very markedly clubbed.* Digestion fair; no diarrhœa; ctma. absent 2 months. *Dulness very marked, with coarse, dry, crackling crepitation over the whole left front. The expiration is long and rough at right apex.* About a year ago she took oil with much advantage. After five months of treatment she gained 10 lbs. in weight, and was in very fair health, with scarcely any cough.

Phthisis 3 double, 6 years. Fingers clubbed.

Sarah S., æt. 26, housemaid. No predisposition to phthisis. Hæmoptysis 6 years ago, and cough with expectoration ever since, till about 2 months ago, when by removal to the country she lost her cough altogether. Ctma. regular, but

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Tolerable health.

scanty; app. poor; bowels reg. No fever. *The fingers are much clubbed. There are two cavities of irregular shape, presenting a very dry character of the sounds.* She improved considerably on oil and bismuth.

Struma. Phthisis 3, very chronic.

Louisa S., æt. 11. Grandfather and aunt died of phthisis. Chronic suppuration of cervical glands; healed up recently. Cough for some years, with occasional streaky hæmoptysis. No present fever; bowels reg. Is much wasted. *For the last year the fingers have gradually become clubbed*, and now exhibit that condition in a very marked degree. *Gurgling and blowing sounds over the whole right front. Humid crepitus at the base posteriorly, left.* This child improved much on syrup. ferri. iod.

Chronic stationary phthisis 3 5 years.

John D., æt. 9, dark hair and eyes. 2 aunts and 2 cousins died of phthisis. Ill for 5 years. Cough, expectoration, and streaky, frequent hæmoptysis. Is not losing flesh, and only slightly wasted. *The fingers much clubbed, and nails incurvated. Gurgling and dulness over the whole left. Clicking on right side.* Improved much on oil.

CHAPTER XIV.*

STRUMOUS PHTHISIS.

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Formation of tubercle before the age of puberty.

Law of Louis.

THE formation of tubercle before the age of puberty possesses features which deserve a separate and careful consideration. The possibility of organs other than the lungs being the seat of its development while the latter remain free, has attracted the attention of all pathologists, and has been implied by Louis in the proposition that after the age of fifteen tubercle, if present in any tissue of the body, is always found in the lungs. The converse remains true—tubercular disease may invade every organ before that age without engaging the pulmonary structure. The fact has been proved by many observations, and may be accepted as a pathological axiom. The universality of the deposit in so many various tissues at this early age argues a cause intensely productive of a uniform morbid result, consentaneous influences helping its elaboration, and a high degree of blood contamination: while it is obvious that either the lungs are in many instances at this period able to throw off the morbid material, or are in their structures and functions less capable of submitting to the infiltration.

The activity of the lacteal and lymphatic systems in early life is doubtless a potential cause in directing the tubercular deposit to the involuted structures which we distinguish as glands, and hence the extensive alterations in the mesenteric, bronchial and cervical

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glands, so common in the infancy and childhood of the children of tuberculous parents.

Influence of growth.

Growth, or the act of nutrition which produces new tissues, renders these latest organisations most liable to become the seat of tubercle. Thus bone is attacked, or rather becomes built up of such materials as render its permanence impossible, and its early destruction inevitable. The more complex and elaborate tissues, as the brain, with large vascular supply and most rapid growth, are very prone to tubercular degeneration, as attested by the great frequency of hydrocephalus in strumous subjects. But while these various structures are in process of formation by an impure plasma, the lung enjoys a comparative immunity.

A period of extreme peril arises when the formative activity of the blood has been partly expended, and the highly organised being has to be furnished with a power of reproduction.

Puberty.

Puberty in some of these subjects is never reached; in others, when attained, vital powers fail, and the organism is irreparably damaged; and some survive to mature age with the seeds of decline then sown, of which the fruit is only to appear when the whole body has reached its natural period of decline. Then, in advanced age, the latent tubercle of early manhood will often reappear, though with altered features. It is still, however, the destroyer; and the habits of living and easy circumstances of the individuals may have warded off the attack throughout years of active life, only to lead to senile phthisis in the end.

Strumous tubercle.

On the other hand, tubercular consumption of the lung is by no means uncommon in early life, and at the strumous age. It is then only one and a most important manifestation of the strumous habit. In treating of the possible absorption of tubercle in the lung, some arguments were advanced to show the identity of the deposit as seen in the external glands

with that in the pulmonary structure. This seemed to be proved by the sameness of the deposit; by the oneness of the hereditary tendencies some children of phthisical parents exhibited, pulmonary and other external strumous disease; by the unity of the processes witnessed in the deposit, whether tending to resolution or to destructive softening and elimination; and by the general constitutional features exhibited by the individuals of the strumous diathesis as compared with the phthisical.

The deposit in the lung and in the glands identical.

The position here assumed is not purely theoretical, but has a decided use in assisting our recognition of the true nature of many of our cases and our prognosis of the results. It will be now our duty to examine whether there are any special characters in the phthisis of early life, and whether these are derived from its association with the so-called strumous habit. As usual, the following statements are to be regarded only as observed facts, for which in every instance reference to cases is or can be made.

Tubercle in the lung may be found in the youngest children, from the infant at the breast. Its most common form at this time consists in a general infiltration. It is often acute, that is, rapidly developed, and the child may perish in the first stage with extensive marasmus and diseased mesenteric glands, or in the second with numerous softened tubercles, or more rarely when the third stage of excavation is reached. Out of 285 cases observed under the age of fifteen, 17 were affected from birth, 126 were in the first stage, 125 in the second, and 34 were in the third stage of phthisis. While under observation 13 died, and the stage was ascertained in 11 of them—viz. 2 in the first, 7 in the second, and 2 in the third stage. Of the whole number, 155 were males and 130 females.

Tubercle in subjects under 15.

Observations on 285 cases.

More males than females.

From the following table it will appear that the

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ten years from 5 to 15 are those in which the affection is most common, and that the male sex begins to show higher numbers than the female from 5 years of age up to 10, when the number are nearly equal. Fifteen is an age of great peril in females.

Table showing the Ages and Sex in 285 Cases of Phthisis under Fifteen Years of Age.

Age	Males	Females	Total
Under 3 yrs.	8	8	16
5 „	24	14	38
5–10 „	64	52	116
10–15 „	59	56	115
	155	130	285

The deaths occurred as follows. Total 13.

Males 3 to 5 years of age, 3 deaths.
„ 5 to 10 „ 3 „
„ 10 to 15 „ 2 „
8

Females under 3 years of age, 2 deaths.
3 to 5 „ 1 „
10 to 15 „ 2 „
5

External suppuration rare in phthisis.

The rarity of a combination of external suppurating strumous glands with an active state of tubercle in the lung has been before dwelt on in the chapter on *the premonitory stage of phthisis.* It is there shown that out of 300 cases of phthisis occurring in persons of marked strumous habit, only 5 had external suppuration, although 33 had enlargement of glands of the chronic kind. The following table gives the observed duration of 300 cases of this form of the disease, of whom the 285 already quoted were the portion under 15 years of age, the small remainder (fifteen) having shown the strumous habit, but being aged from 15 to 40.

Table showing the observed Duration of the Disease in 300 *Cases of Phthisis, in the Strumous Habit, of which* 285 *were under the Age of Fifteen.* [This table does not express the duration up to the time of death.]

Duration.	No. of cases.	
Had been ill 6 months	30	
„ 1 year	51	
„ 1½ year	24	
„ 2 years	23	
„ 2½ „	11	
„ 3 „	8	
„ 3 to 4 „	10	
„ 4 „ 5 „	9	
„ 5 „ 6 „	6	
„ 6 „ 7 „	4	
„ 7 „ 8 „	1	
„ 8 „ 9 „	1	
„ 12 „	1	(adult)
„ from birth	17	
„ indefinite long periods	104	
Total	300	

State on leaving hospital:—Better, 87. Worse, 55 (of whom 13 died). Stationary, 158. =300.

Average duration of strumous phthisis.

The average duration of each of these cases is 23·61 months, without reckoning those ill for 'indefinite periods.'

Localisation of the deposit. Diffused, or at base.

The localisation of the tubercular deposit in these cases is sometimes peculiar, and deserves attentive consideration. It is found most commonly either in the diffused form, i.e. scattered throughout one or both lungs without much coalescence or grouping; or by no means unfrequently at the base of one or both lungs, the apices remaining clear for lengthened periods. The latter condition is to be regarded as favourable both for cure and for chronicity, and bears out the view already advocated, that tubercle at the base of the lung generally makes a slower destructive progress than when it is first developed in the ordinary mode at the apex. In 46 instances out of the 300 given this condition was observed; and several examples of the removal of the deposit, when in this part of the lung, will be found in the cases at the end of this section.

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Absorption may take place.

It must be held as no longer doubtful, that complete absorption of the deposit may take place; nor can the argument, that in cases where a cessation of the physical signs and of the constitutional disturbance occurs, the seat of the disease is in the bronchial glands at the root of the lung, be considered valid. The localisation of the physical signs, either diffused over the lung or at its base, forbids such a supposition; for however difficult the diagnosis of deposit in the glands may be, it is certain that when the disease is limited to them, the sounds of crepitus, dulness, &c., cannot be heard over the pulmonary space, and especially at the base. The truth is, that in these cases of bronchial phthisis the lung is itself almost always engaged.

Ordinary history of strumous phthisis.

Acute variety.

The ordinary history of phthisis in the strumous habit may be studied in its two forms of acute and chronic. The acute variety has been already sketched in the chapter on 'Acute Phthisis,' and may be regarded as an invasion of the whole system by the tubercular disease, as after death nearly every organ in the body will be found engaged. The fever is high and without remissions, the pulse sustained at a rapid number, the digestive disorder urgent and extreme, the local disease rapidly progressive. With these symptoms the disease is often fatal in from three to seven weeks. Not unfrequently some of the zymotic diseases of children occur, and precipitate the tubercular disease.

Case.

J. G., æt. 2. Mother out-patient now with pht. 2. Rubeola and pertussis within the year; cough 3 months; night-fever, wasting, sweating, extreme; app. bad, b. costive; abdomen large, knotty; urine high-coloured, offensive. *Chest pigeon-shaped; rough murmur with first sound; diffused crepitus both lungs;* large, knotted, hard swelling in parotid region; umbilical hernia, &c. &c.

Chronic form.

This case needs no comment. It is when the disease is slow and becomes chronic that it possesses higher

interest. In such instances it begins insidiously, and seems a disorder of growth. The frame is not hardy, the complexion is pale, the expression delicate, the skin fine in texture and does not freckle easily. Some amount of dyspnœa may precede the cough, which is commonly dry, or even absent, and expectoration rare; in very young subjects absent. An hæmoptysis may occur in very early life. I have seen it at eighteen months, two years, three years, five years of age, repeatedly; but never profuse under five years.* The amount of wasting is not great, and is rather referred by the parent to arrest of development. Febrile accesses will be noted, more or less acute, but in the chronic variety they always subside. Their continuity means continuous phthisis; their absence is a sign of improvement, and a prognostic for chronicity better than all other evidence put together. With their cessation the little patient partially regains flesh, may lose his cough, and, especially after a residence at the sea, presents an aspect which will satisfy any but a medical eye. Nay, perfect recovery may take place, and no evidence of past mischief can in certain cases be found. The physical signs indicate one of these conditions:—

Profuse hæmoptysis, not under 5 years æt.

Fever.

Physical signs indicate 3 varieties.

1. A diffused deposit in one or both lungs, evidenced by dulness of the percussion tone, harsh and occasionally wavy inspiration, expiration long and rough, and a crepitus of any shade of intensity, from the very dry to the actually humid.

Diffused.

2. Physical signs entirely confined to the base of one or both lungs, consisting of dulness, and a crepitus as above described.

At base.

3. The ordinary localisation at the apex of one or both lungs, where marked and defined dulness, bronchial voice, and tubular blowing, with varying harsh tones of the respiratory murmur, and prolonged ex-

At apex.

* In 351 cases of profuse hæmoptysis, only 43 occurred in persons under twenty.

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piration, with or without crepitus, indicate a pretty extensive deposit. In this last condition there is seldom the decided limit to the disease often met with in adults. The signs shade off towards the base of the lung.

Diffused deposit.

The diffused deposit in the child, as in the adult, can exist with but little active disturbance of the general health, provided the signs due to inflammatory action are absent. A very fine crepitant sound, with much dulness, extending over a large pulmonary space, is frequently found coexisting with a tolerable state of health. There may be little dyspnœa, no pain, scarcely any cough, and no expectoration, with a complete absence of fever, while the physical signs denote the existence of softening. Were we here to measure the actual gravity of the case by percussion and the stethoscope, and to deliver a prognosis of rapidly increasing danger, we should greatly err. Such cases may go on for years in a scarcely varying condition of tolerable health, so long as the hygienic requirements of warm clothing, abundant food, and fresh air are forthcoming. They are among the successful cases which leave our hospital with 'arrest' after their names, but they die when shut into the wretched garrets and courts from whence we have taken them to the purer air and abundant healthy food of our wards. It is especially to be noted in the class of children here described, that growth is stopped, and the development of the body beyond a certain point is never attained. If puberty is reached, an unexpanded figure and retarded menstruation in the female, and a stunted growth in the male, with a persistent childish voice often up to the age of sixteen or seventeen, show the incompleteness of the maturity which nature scarcely seems to promise. They are dwarfed in figure, and sometimes (though not always) in intellect, and the arrest of development strikes us before a more minute

Growth stopped.

physical examination reveals the cause. Growth is at a standstill, and though the body does not waste, it ceases to increase.

Signs at base.

The history of the disease presenting physical signs at the base does not differ from that of diffused deposit. Both belong to the chronic, slow variety, with occasional exacerbation of symptoms. The secondary disorders, diarrhœa, &c., may occur, but are commonly delayed to a later period of the disease, or if present, are slight. The influence of remedies is very marked. Good diet and wholesome sanitary influences mostly increase the muscular system, and the patient may even fatten. Cod-liver oil much assists the nutrition of the body; and many of these patients seem well nourished, till, on examination, it is found that the tissues are flabby, and permit of rapid variations in weight.

Case. Phthisis 1, after measles and hooping cough. Recovery. Oil for 2½ years.

April 1855. Ellen P., æt. 9. No predisp.; rubeola 18 months ago; pertussis 1 year ago; slight cough ever since; hæmopty. slight 3 weeks ago; lately sweats; wasting 2 months; app. bad; t. clean; b. reg.; *dulness, prolonged expiration, bronchial voice, right.*—Nov. No cough; *same phy. signs.*—Feb. 1856. *Resp. very tubular*; health improves.—July 1857. *Very slightly prolonged expiration only*; in excellent health; much grown; has taken oil and v. ferri 2½ years.

Diffused tubercle. Arrest of development. Very chronic.

Maria M., æt. 16 (looks 13). No predisp.; habitual cough for years; worse in summer; no hæmopty.; dyspnœa; pain in right; moderate expectoration; is moderately wasted; chest flat; mammæ not developed; has never menstruated; app. fair; b. reg.; *diffused double crepitus over both sides, most marked at right base, dulness most marked at right apex.* Ordered chloric æther mixture, croton liniment, &c. She improved much and gained flesh.

Struma from birth. Phthisis 2. Hæmopty. Age 1½.

A. P., f., æt. 1½, still at breast. Strumous inflammation of eyelids; purulent discharges; impetigo of lips; enlarged cervical glands; much wasting; bowels loose; severe cough; *hæmoptysis last week*; aphthæ on mouth; *dulness and extensive crepitus, left.* (Once seen.)

Case.

Oct. 1860. C. L., æt. 7½, f. Grandfather (only) died

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of phthisis. Strumous aspect, light hair, blue eyes, &c.; others of family have enlarged glands; out of health since 4 years of age; great enlargement of mesenteric glands, hard, painless; lumbar abscess opened 3 months now, discharged 3 pints, now closed; constant cough some months; one streaky hæmopt.; no expectoration; diarrhæa 3 m. in day; app. good; *crepitation diffused, with dulness over whole left lung.* To take oil, syrup. ferri iod. and sedative mixture. She rapidly improved, regained flesh and strength. —July 1861. Profuse hæmoptysis; *phy. signs cleared up*; *soon after crepitation replaced by cooing sounds with dulness*; looks hearty.—Dec. 1861. Another profuse hæmopty. after a fall, but rapidly recovered; and in January 1862 *presented no physical signs.* Had lost her cough, diarrhœa, &c., and regained the appearance of good health. Under treatment 15 months. Duration about 5 years.

Phthisis 2. Mesenteric disease. Lumbar abscess. Recovery. 5 years.

Case. Softening sounds at base; cleared up.

January 1861. E. C., æt. 14, m. No predisp.; cough only 3 weeks; hæmopty. florid, mixed, last week; expectn. thick; moderate night-sweats; loses flesh; app. bad; b. reg.; *dulness and moist crepitus, whole base, right.* Oil, quinine, counter-irritation to base. In July *he was quite well*; *no physical signs whatever.*

CHAPTER XV.

AGE A MODIFIER OF PHTHISIS.

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Age at which phthisis is most prevalent.

THE first Medical Report (1849) of the Hospital for Consumption states, that the age most affected by phthisis in all its forms is the decade from 25 to 35 years. The second Report (1863) 'exhibits a large preponderance of cases between the ages of 20 and 30. On either side of this decade the numbers diminish in about an equal ratio.' *

From	10 to 20	there occurred	1,331	cases.
„	20 „ 30	„	2,708	„
„	30 „ 40	„	1,444	„
„	40 „ 50	„	551	„

This was out of a total of 6,134 cases.

The age at which the disease is most prevalent is thus sufficiently marked. But of the forms and varieties in which the affection presented, the Report takes no notice. It has indeed been the fashion to regard phthisis as a single affection, as a class without varieties, instead of studying it as it really is—a family of tubercular affections composed of many groups, offering much variety in its manifestations, and requiring, not only for the purpose of study, but as a requisite in practice, many important subdivisions.

It is also to be remarked, that very young and very old cases are not commonly found among the in-patients at the hospital, from whom the Report was

* p. 5.

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prepared; and without doubt, age is a regulator of the type and progress of the disease to a very considerable extent.

Phthisis attaches itself to the ages of growth and decay.

Phthisis, notwithstanding its prevalence at all periods of life, appears to attach itself remarkably to the age of growth and to the age of decay.

The age of growth; forms of phthisis in.

In the former period are found its most formidable manifestations. Acute phthisis, strumous phthisis, the ordinary continuous form of the disease—that in which cavity is quickly formed—and the large class which arise out of acute disorders. Marked hereditary predisposition also exhibits its influence at the time of life at which growth is most rapid, and rarely delays to strike its victim till the period of decay.

Even then its influence has not died out, for numbers who are hereditarily predisposed to phthisis survive the age at which it is most destructive, to perish in very advanced life of the same malady.*

Age of decline.

It is common for insurance companies† to regard the proclivity to phthisis acquired by hereditary tendencies to have died out at 45; but although the greatest amount of danger is past at this age, many cases occur and much mortality prevails in more advanced life.

Authorities quoted.

Authorities are quite agreed on this point. Maclachlan says, 'At Chelsea Hospital, tubercles, tubercular concretions, chronic diffused grey consolidation, excavations or traces of recent and ancient cicatrised

* A table carefully constructed by Dr. Fuller, from the Registrar-General's Reports, shows that 'the mortality from consumption does not vary materially between the ages of fifteen and seventy, but is actually somewhat less between the ages of ten and forty than it is between the ages of forty and seventy.'—*On Diseases of the Chest:* Dr. Fuller. Lond. 1862, p. 351.

† The rule of many offices is to decline a life if two members of the family have died of consumption, unless the applicant is past the age of forty, and personally free from any suspicion of disease. Even then an advanced premium is demanded.

cavities occur in the lungs of about one-half the number of the men examined, whose age varies from 60 to 80 and upwards.' *

Williams found tubercles in half the cases of post-mortems of persons past middle life, dying from various diseases in London and Paris.†

Roger,‡ in one hundred females examined at Salpétrière over sixty, found in fifty-one cretaceous or calcareous concretions in the lungs, and other signs of cured or existing phthisis.

Beau,§ in 160 aged females dying of other affections than consumption, found in all, with three exceptions only, indications of former phthisical disease.

Brinton ‖ considers that at 40 half the danger from phthisis is over, and at 50 three-fourths of the danger in males, and four-fifths in females.

Christison¶ gives the number of deaths from phthisis in persons selected for insurance in the Scottish Widows' office as 48 per cent. between 30 and 40, and 22 per cent. between 40 and 50 years of age.

In the Edinburgh Royal Infirmary, out of 852 cases of deaths from phthisis in males, 25 per cent. were above 40, and 8 per cent. above 50.

In London, in 1845, 3,624 males died of phthisis, of which 36 per cent. were above 40, and 15 per cent. were above 50.

In the 'Standard' office, of lives accepted when over 40 years of age, 5 per cent. died of phthisis, and of those accepted after 50, 2 per cent.; after 55, 1 per cent.; and after 60 none died of consumption. These were, of course, selected lives—that is, the hereditary element was not present.

* *Op. cit.* p. 333.
† *Lib. Pract. Med.* vol. iii. p. 183.
‡ *Archives Gén. de Méd.* t. v. p. 183.
§ *Etudes Clin. sur Mal. des Viellards*, p. 19.
‖ Brinton, *On Life Assurance.*
¶ *Edinb. Monthly Journal*, vol. xvii. 1853.

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In a later report from the same office (1860), out of 582 deaths among the assured, phthisis was the cause in 10 per cent. These were mostly persons in advanced life.

There is therefore abundant evidence of the existence of the disease in advanced life.

Phthisis of advanced age most common in males.

In hospital out-patient practice, I have collected 174 cases which were over the age of 45. Of these one-third only were females.

Stage.

The stage of the disease was ascertained in 146 instances, as follows:—

First stage	33 cases.
Second „	71 „
Third „	42 „

Age.

	Males.	Females.
Between 45 and 50 years of age . .	54	30
At 52 years of age . . .	6	6
„ 54 „	9	3
„ 56 „	7	4
„ 58 „	7	2
„ 60 „	7	3
Over 60 „	10	0

Tendency to form cavity.

The physical signs were confined to the base of the lung in 8 instances. There were 9 cases of diffused tubercle. The tendency to form cavity seems rather marked.

Age at modifier of duration.

Viewed from the side of duration, phthisis has a new aspect; and it is in this sense, as well as in the form of the disease, that age is a great modifier.

It has already been seen that the hereditary form of the disease and its most acute manifestations are found during the years when the frame is being built up and completed. It is in advanced life that the slowest variety of the disease is often seen; but very chronic phthisis (as has been abundantly shown) may prevail at any age. Still it holds good as an axiom that after 45 the disease is slow to advance. The average observed duration of my cases was 33·76 months, as compared

After 45 disease is slow.

Average duration.

with ordinary phthisis (all ages), which stands at 15·22 months; and at the time of leaving the hospital the condition of the majority was favourable, as shown in the following table:—

State on leaving hospital.

Better on leaving . . .	31	
Worse	34	(4 died)
Stationary	81	

Observed duration after 45 years of age.

The following shows the observed duration of the 146 cases of phthisis, in individuals over 45:—

	Cases.		Cases.
Ill for 6 months . .	13	Ill for 5½ years . .	8
„ 1 year . .	21	„ 6 „ . .	2
„ 1½ „ . .	23	„ 8 „ . .	2
„ 2 years . .	11	„ 9 „ . .	1
„ 2½ „ . .	13	„ 10 „ . .	1
„ 3 „ . .	11	„ 12 „ . .	2
„ 3½ „ . .	4	„ 15 „ . .	1
„ 4 „ . .	4	„ indefinite long periods	20
„ 4½ „ . .	8		
„ 5 „ . .	1	Total . .	146

The succeeding table shows the different forms of phthisis, and the numbers of each variety, at the different ages:—

Table showing the Number of Cases of the Different Varieties of Phthisis which occurred at the Different Ages. (*Both Sexes.*)

Varieties of Phthisis	Ages in Years															
	3	5	10	15	20	25	30	35	40	45	50	55	60	65	70	76
Ordinary phthisis	3	1		18	125	172	156	126	94	57	20	2	2	1		
Chronic 1st stage				9	28	62	63	49	35	30	10			1		
„ 2nd „		1		6	27	47	52	43	41	27	11	9	2			
„ 3rd „		2		2	31	44	38	42	24	17	5		1			
Strumous phthisis	16	38	116	115	5	6	8	1	3		1					
Rapid phthisis			1	2	45	48	54	32	22	12		1				
Rapid waste					2	5	8	8	2	3	1					
Origin in acute diseases		16	12	7	7	7	5	6	8	4	3	1				
Dry cavity Tolerated cavity			1	3	10	21	16	11	9	8	1	1				
Pregnancy Lactation					5	41	87	61	35	5						
Carried forward	19	58	130	162	285	453	487	379	273	163	52	14	5	2		

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TABLE—*Continued*

Varieties of Phthisis.	Ages in Years.															
	3	5	10	15	20	25	30	35	40	45	50	55	60	65	70	76
Brought forward	19	58	130	162	285	453	487	379	273	163	52	14	5	2		
Clubbed fingers			4	3	7	7	11	4	8	1		1				
Rheumatism		2	6	4	29	24	24	13	16	9	5	4	3		3	
M. cordis pht.																
Bronchitis						9	11	10	15	11	9	5	7			
Emphys. pht.																
Signs at base*					4	6	14	6	9	14	5	4	1	1		
Age over 45											84	24	30	7	3	1
Fistula-phthisis					3	5	3	6	8	2	2	1				
Syphilis-phthisis					1	5	11	7	3	1						
Profuse † hæmoptysis					43		165	101		40						
Oil very useful			1	1	19	13	24	16	12	9	4	1				
Totals	19	60	141	170	391	522	750	542	344	250	161	54	46	10	6	1

The varieties of phthisis modified by age.

Viewing the disease as a whole, its greatest prevalence is undoubtedly to be found between 20 and 45 years of age; but it will be observed how large a number of cases occur after this age. In early life, a great wave, as it were, sweeps off most of those hereditarily predisposed, and nearly all the strumous. The zymotic diseases and acute fevers incident to early life leave behind them germs of disease in which, or from which, are developed some of the most formidable varieties of the disorder. Among these rheumatism is very marked as exhibiting a cause predisposing to tuberculosis, or identical with it. The vascular system being at its fullest and in its most active condition, congestions of the lung and hæmorrhages are prevalent. Pregnancy is found to complicate, to develop, or to precipitate phthisis remarkably, and exerts a powerful influence from 20 to 40 years of age, culminating at 30. While the nutrition of the body is most vigorous, and san-

* The strumous cases presenting this peculiarity are omitted.

† These numbers are differently grouped from the others: '20' means from 10 years of age to 20 years, &c.

guification most active, extreme alterations of weight are most likely to occur. The dry cavity and tolerated cavity are not often found at the strumous period, the nature of the deposit in the latter being generally diffused, and often involving the bases of the lungs, seeming to interfere with the formation of circumscribed excavations. Fistula is found ordinarily in the middle periods, as is also the complication with syphilis. For the same reasons as those which influence growth, the use of oil is found most beneficial during the years devoted to perfecting the frame. In advanced life there is much less benefit to be derived from its use.

Processes of growth and decay considered.

It is thus, in regarding phthisis as a single manifestation of constitutional disorder, we are compelled to recognise as influential on its course all that is concerned in the processes of growth, of maintenance, and of decay, as emanations from a cause common both to the healthy action and the diseased product. Tubercle is possibly the perversion of normal material, and may represent alterations in the quality of that which was destined to the formation of healthy tissue at the period of growth. In the acceleration which the tubercular disease receives during early life, in the formative period of pregnancy, and again in the decline of vigour and decay of tissues, we may recognise a sameness of producing cause. Intimately associated with the production and the disintegration of the body, the age in which it is found may possibly become the guide to a discovery of the nature of the error in which it originates.

Phthisis of youth and age contrasted.

The phthisis of early life is acute and rapid, involves many organs simultaneously, and is a blood crasis of manifest severity from its commencement. The phthisis of more advanced age is often latent in its beginnings, slow in its advance, tending to the destruction of limited portions of the lung, and is found with few secondary

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derangements accompanying. Destruction of pulmonary tissue without limit, by inflammatory or irritative actions almost continuous, characterises the phthisis of puberty: concentration of disease in one part, moderated and remittent inflammatory attacks, but excessive tendency to degeneration, mark the phthisis of age. The calcareous transformation is most frequent in the elderly adult; the broken-up chain of cavities, with scarcely any healthy lung intervening, is the too frequent history of the disease in the young. A retrograde action is evident in the morbid matter deposited in the aged, with little tendency to irritation of the surrounding tissues; in the young, the vital or chemical changes causing softening of the tubercle and irritative ulceration of the lung in which it is imbedded are characteristic features. In the aged, systemic disorder, rarely very high, does not find a machine working at extreme pressure, but rather at slackened speed; in the young, the whole energy of the animal is being devoted to nutritive action when the disturbance occurs, and the resulting disarrangement is proportionate to the importance of the operations interfered with.

It is thus that, when a cure cannot be looked for, chronicity rises to be an important feature in a disease ultimately, but not uniformly, destructive in its progress, and that a careful estimate of all which retards morbid action becomes a study worthy of the scientific physician. In this light, age, as a modifier of disease, is an agent deserving our most careful investigation.

Second access of disease at the decline of life.

The second great access of disease in the phthisical habit may be observed at the period of the decline of life, but with modified characters. That a latent constitutional affection should resume active conditions when vital processes are lessening, and the office of the nutritive powers is rather to sustain the old than to build up new tissues, is puzzling, but not contradictory. A diminished vitality may oppose fewer obstacles to

the development of disease than when the system is at its highest power. A disorder incident to nutrition (if this theory be accorded), and whose essence consists in the elaboration and deposit of a morbid material, may find its earliest pabulum in an overabundant and newly formed plasma; but in the activity of the respiratory, secretory, and circulatory processes, an exit may present to get rid of the offending material. The glandular apparatus of the body (if the identity of the strumous and tubercular habits be granted) may serve as a diverticulum for morbid matter in early life, and the lungs be saved till the glandular system reach its period of decadence, when the respiratory becomes the seat of the deposit.

Old deposits from inflammation break up in advanced life.

Old deposits in the lungs, themselves the result of low inflammatory actions in early adult life, which have never been absorbed nor wholly organised, often become the seat of tubercular changes when age advances. Doubtless some of the cases in which the base of the lung is found to be the seat of tubercle in elderly persons are thus to be accounted for, and are only old results of inflammation which have become the nidus of tubercle, or take on the ulcerative actions of tubercle without being identical with its composition. The examination of the aged proves that consumption may exist independently of tubercular development, contrary to the opinions of Louis and Laennec.

Phthisis in age often the sequence of inflammation, of bronchitis, and may exist without tubercle.

'Senile* phthisis is often the sequence of chronic bronchitis, ending in indolent inflammation or partial induration; the induration breaks down into cavities, non-tubercular, dark, sloughy, without membranous lining.' Such appears also to have been the opinion of Armstrong, Graves, Stokes—of Bayle, who calls it 'ulcerative phthisis,' and of Addison, who named it

* See Maclachlan: *op. cit.* Grave's *Clinical Lectures.* Armstrong: *Lectures Pract. Physic.*

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'pneumonic phthisis.' 'The pneumonic species of consumption is a truly scrofulous form.'

Phthisis of age described.

Age, then, is a modifier of the type, and exercises a controlling influence over the progress of the disease. Should phthisis invade the system after forty-five, we are to expect a slow form, moderate febrile action, and tardy advance of pulmonary mischief.

Emaciation the earliest symptom.

A long period of emaciation generally precedes the positive evidence to be derived from physical signs. The system as a whole degenerates, and the nutritive powers decay before structural mischief announces itself. A steadily progressive emaciation, therefore, without evident organic alterations, is to be regarded with great suspicion in the elderly. In this respect phthisis remains true to its type, and verifies the name which all countries have bestowed on it, '*wasting*.' As in earlier life, so in latest, an altered nutrition is the first evidence of the invasion of the disease.

The pulmonary symptoms are most commonly ushered in by cough, which passes for bronchitis in its insidious and more chronic form. The case, indeed, may retain this name till its observed continuity, the absence of the summer remissions, and the progressive weakness of the patient, stamp it with its real characters.

Profuse hæmoptysis rare.

Hæmoptysis, which many regard as so characteristic of the disease, is generally absent. In its profuse form it is especially rare. Out of 351 cases of copious hæmorrhage from the lungs, in my practice, only 40 occurred after the age of forty.

Pulse often a measure of the extent of local disease.

The pulse, in senile phthisis, is often very quiet, unless a great amount of structural disease exist; so that it is, in a sense, the measure of the extent of local disease.

Pain is of rare occurrence, the passive character of the affection being here again manifest, the pleuritic

attacks so common in the phthisis of adults being seldom observed. Febrile symptoms of severity are also absent as a rule; nor is dyspnœa so pressing a cause of distress as in ordinary phthisis.

Gastric disorder rare.

Serious errors of digestion, as vomiting and nausea, are rare; nor is the cough of that character which brings up food, and proves so distressing in earlier life. Simple anorexia is, however, a very common symptom. Secondary diarrhœa is also less frequent, and is often delayed till a late period of the disease, or even absent altogether.

Secondary affections rare.

Degeneration of organs may be present with phthisis.

Other secondary affections, not belonging to the phthisical class, are, however, often found combined with the disease in advanced life. Those which originate in degeneration, as might be expected, are common: such are fatty conversion of organic tissues, the heart and arteries, or in the cornea, where the arcus senilis is found at an earlier age than is usual in non-phthisical cases.

Helps to chronicity.

With more or less of these symptoms the patient may linger on for years, especially if provided with the comforts of life, warmth, food adapted to his requirements and appetite, and a fair allowance of stimulants. Mental quiet, and all that 'should accompany old age,' when permitted to surround the patient, infinitely tend to the prolongation of his life. He should not travel about, nor seek the delusion of climatic cures, if he is past sixty. At such an age the fatigues of removal, and the absence of habitual comforts, of the well accustomed chair, and of the bodily requirements which time and tender care may have accumulated about him, are poorly compensated for by change of air.

With such care the case may be indefinitely prolonged, and life may be even tolerably easy to the last. And when the end comes, it is often due to some of the secondary accompanying and non-phthisical concurrents, as cardiac or arterial degeneration, affecting the

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central or distal seats of circulation at the heart or in the brain.

Numbers in males.

It has been remarked already that this form of the disease is much more common in males than females. My tables give 100 of the former to 21 of the latter.

Signs at base.

In many cases the physical signs are at the base of the lung. Out of 72 instances of this localisation of the disease, there were 35 males and 6 females over the age of 40, and 8 of the males were over 45 years.

Confined to one lung.

The disease is generally confined to one lung, and the apex is its most common seat. The tendency to form cavity has been remarked, the tubercle being massed in one part, and the other portions of the lung being ordinarily healthy. Authorities have remarked on the tendency to contraction and cicatrisation of excavations in advanced life, and on the frequency of calcareous transformations of the tubercle.

Post-mortem appearances.

The appearances of such lungs after death are composed of aggregated tubercular masses, seldom exceeding the size of a pigeon's egg, of iron-grey colour, black from pigment admixture. The pleuræ are generally adherent over the cavity or deposit. The ordinary appearances of cicatrices of old standing are very common. It has been remarked that the cavities are more frequently lined than in adult cases.

Acute phthisis may occur in advanced life.

Although the tendency to slowness in the advance of disease is marked after the age of 45, yet cases of acute phthisis occasionally occur. At Chelsea, a case æt. 73 died in less than three months, and within six weeks of cavity forming. I subjoin an interesting case which occurred in my own practice. Hasse (quoted by Maclachlan) gives a case of rapid phthisis æt. 89, and Blakiston a case æt. 73, which died in six weeks.

Case of acute phthisis, æt. 60. Cavity in

X. Y., a gentleman æt. 60, without hereditary tendency to phthisis, and having previously enjoyed good health, consulted me in January 1860. He had been suffering from cough for six weeks, and felt rather out of health. *Percus-*

4 months, death in 6. Post-mortem.

sion good, slight sonorous râles diffused chiefly over right side. Ordered pil. hyd. c. ipecac., linimentum ol. crot., mist. ipecacuan. I sent him to Hastings, with a request to place himself under Dr. Blakiston's care.—May 3. Dr. B. writes, 'Dry harassing cough, expectoration often reddish, is extremely weak, liver much out of order, clayey stools, *little or no dulness, mucous clicks, expiration prolonged over upper third anterior right chest, also bronchophony.*' Dr. Lionel Beale examined the sputa microscopically, and reported 'tubercle corpuscles, portions of pulmonary tissue, granular cells from bronchial tubes, mucus with carbon;' pulse weak, 120; kept up while health improved, expectoration nearly ceased, legs began to swell, action of heart more feeble, *a threatening of gangrene on one foot,* and on the other a blister formed and broke. Dr. Blakiston's diagnosis was, 'tuberculosis of right lung, whether in the common form or existing as tubercular pneumonia; heart with feeble walls and tendency to degenerate. Prognosis unfavourable.' Treated by small repeated doses of brandy, mixt. of acid. nitro-mur. and taraxacum, pepsine; nitro-mur. acid applied externally; cod-liver oil.—May 4, 1860. I again saw him with Mr. Brown, of Brixton. Cachectic appearance; colour sallow; has lost flesh considerably; complains of gasping and a sudden short catch in the breath; scarcely any cough; raises one or two fragments of rusty-coloured expectoration daily; no fever; pulse 80; both legs œdematous, and thighs (less); an unhealthy, glassy-looking ulcer on dorsal aspect of left toes; a dark-coloured vesicle on the toes of the other foot; warmth of feet fair; femoral pulsation felt to be equal and full; *chest emaciated, much flattened in right subclavicular space, with mobility much impaired; dulness for about 3 inches from the clavicle; bronchial voice, and respiration over this space; lower than this a fine crepitus; same signs in superior scapular region for some inches; the hepatic dulness is increased anteriorly and posteriorly, and comes below the ribs; the liver feels irregular and hard at this spot; heart's sounds weak, distinct, impulse lost, no murmur;* tongue red, moist, ragged, stripped; bowels open by medicine; urine abundant, pale, not albuminous; the ulcer on the foot slightly extended and grew nearly black; the slough never separated. Dr.

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Watson saw him with Mr. Brown and myself at the end of May; and Dr. Blakiston being in London for a day or two, favoured us with a visit. There was a doubt whether some malignant formation or deposit occupied the right lung; the age of the patient and rapid progress of the case somewhat favouring this supposition. Treatment of a supporting kind was directed; but, in spite of all our efforts, the patient daily lost strength, and died exhausted, with symptoms of effusion into the pleura, on June 12, 1860, being within six months of the time of the earliest symptoms.

Post-mortem examination 36 hours after death (with the assistance of Mr. Brown):—About 4 quarts of fluid in the pleuræ, chiefly the right; right lung pressed upwards and backwards; no adhesions excepting at apex of left lung; right lung dark, solid, hard, non-crepitant upper two-thirds; this portion was infiltrated with granular tubercle commencing to soften; a small cavity existed at the posterior part of the apex; the deposit appeared to be a form of tubercle with an exudation of inflammatory products of a white fibrinous appearance; under the microscope there was a large amount of fat and tubercle corpuscles; left lung at its apex was slightly infiltrated with the same; heart large, flabby, dilated, valves and lining membrane of vessels healthy; the femoral vessels healthy; liver enlarged, very hard, studded with yellow granular deposit. Dr. Lionel Beale, and my colleague Dr. Scott Alison, agreed with me that the deposit in the lung was tubercle, modified by inflammatory action.

This was a very rapid case, ending within six months. When examined in January, he had no signs of consolidation of the lung, and only the symptoms of bronchitis. The invasion of tubercle was inflammatory, and the consolidation such as, *if placed at the base instead of at the apex of the lung*, would certainly have passed for a pneumonia during life, accompanied as it was by a rusty-coloured expectoration. The post-mortem appearances and microscopical evidence left no doubt as to its being tubercle. The invasion was acute and expended itself. The pulse was latterly tranquil, the pulmonary symptoms quite in abeyance. The

anasarca was accounted for by the disease of the liver. The cause of the gangrenous ulcer was not very evident, and we were not able to explore the vascular system sufficiently to clear up this point. As regards the tubercular disease, the case illustrates many features of rapid senile phthisis.

Chronic pht. 2.

Chas. M., æt. 63. Cough for 10 years; slight difficult expectoration; dyspnœa; no hæmopty.; digestion impaired; *dulness and marked humid crepitus for some inches right apex*; much improved by sedatives and counter-irritation.

Phthisis with bronchitis. Dilated bronchus.

Thos. P., æt. 52, bricklayer. Winter cough and dyspnœa 4 years; hæmopty. some years ago; difficult frothy expectoration; no fever; much out of flesh; decubitus on left; *sinking and fixity under both cavicles*; *dry bronchial râles both sides*; *tubular respiration and voice right apex.* He improved on mist. scillæ c. lobeliæ, pil. conii c. morphia, and was under treatment 18 months with the same physical signs. The diagnosis appeared at the time to lie between dilated bronchus and tubercular deposit with bronchitis.

Acute formation of cavity.

July 1855.—Robert D., æt. 56, clerk. Ill 5 months; dry cough in Feb.; slight hæmoptysis twice 6 weeks ago; moderate but increasing expectoration, yellow, easy, chiefly at night; had sweats and much fever in Feb.; none now; app. good; b. reg.; weight 10 st. 2¾lb.; *dulness, immobility, flattening, gurgling for* 3 *inches apex right.* Improved on oil.

Chronic cavity

January 1857.—James M., labourer, æt. 61. No predisposition; cough for 10 years in winter, constant last 2 years; no hæmoptysis; morning expectoration abundant, thick, easy; is slightly out of flesh; app. poor; b. regular; no fever; *dulness, gurgling, subclav.*; *bronchial resp. and voice posteriorly right.* Improved on sedatives with counter-irritation.

Inherited longevity. Signs at base.

Frank R., tea-dealer, æt. 76 (looks 66). No predisp. to phth. His father died at 76, mother at 87, his aunt at 97. Has suffered from dyspnœa for 10 or 12 years; nights broken by this distress; cough moderate; expectoration slight; app. good; bowels regular; *dulness and very marked crepitation over anterior inferior portion of left lung*; *decubitus on right.*

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Strumous phthisis; cavity; æt. 50.

Rob. A., æt. 50, clerk, height 6 feet 3 inches. No predisposition; suppuration of cervical glands 18 months ago; cough ever since; thick white expectoration; no hæmopty.; fistula in ano, operation years ago, but discharge remains; tongue very red, cracked; nausea; night-sweats; *dulness, coarse crepitus, nearly pectoriloquy right apex; occasional click on cough, left.* Got rapidly worse, the gastric symptoms increasing in severity.

Chronic slow phthisis with bronchitis.

Thos. S., æt. 62, lodge-keeper in Kensington Gardens. Winter cough for 3 years; slight, difficult, frothy expectoration; no hæmoptysis; no loss of flesh; app. good; bowels irregular; *percussion note low throughout both sides; coarse crepitation and much resonance of voice supraclav. only, right.* Was doing well at the end of 12 months (the fourth year).

Diffused tubercle, æt. 59.

Thos. H., æt. 59, labourer. Ill 1 year with cough and expectoration; occasl. hæmopty. with relief; night-cough; cold sweats; loss of flesh; walks from Norwood to the hospital; *dulness, flattening, crepitation moist diffused over left.* Improved much on oil and sedatives, with iodine solution externally.

Prognostics of Phthisis in the Aged.

1. Phthisis occurring in advanced life is commonly slow. Gradual emaciation is generally the earliest symptom.
2. The more advanced the age, the more likely s it that the form of the disease will be the laten in development, and the chronic in form.
3. Acute phthisis may arise in age, and either terminate in rapid and extensive deposit, or in localised and massed deposit in the apex which forms a cavity.
4. A quiet pulse is one of the most favourable of the good symptoms. A permanently accelerated pulse indicates extensive and advancing deposit in the aged.
5. A long-continued and progressive emaciation is a bad symptom, even while the pulmonary symptoms are moderate.

6. The complications common to phthisis in the ordinary form (diarrhœa, laryngitis, profuse hæmoptysis) are not ordinarily present in the tuberculosis of advanced life. Their absence does not imply safety, although their presence is of evil import.
7. Old deposits in the lung, the result of low inflammatory action, often at the base, commonly break up in old age, and assume the tubercular form. These cases are often very slow.
8. The disease may be confined to one lung in the aged, and yet prove fatal; a fact which, as it is the reverse of the ordinary events of phthisis, should be borne in mind in offering a prognosis.

CHAPTER XVI.

RHEUMATISM, GOUT, DISEASE OF THE HEART.

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The rheumatic diathesis a cause of phthisis.

In the section on the premonitory stage of phthisis, the rheumatic and gouty constitution was considered as a causative agent in the production of tubercle. In many instances rheumatism is the direct forerunner of phthisis, and in very many the two affections are associated in the same individual, attacks of rheumatism or gout occurring in the course of ordinary consumption.

The tubercular and the rheumatic diatheses are doubtless very intimately allied. The hereditary influences may be the same in both. Rheumatic parents often have phthisical children, or one child of such parentage will exhibit the rheumatic, and another the tubercular affection. That rheumatism is frequently propagated by descent is undoubted, and with such hereditary antecedents it is not uncommon to see strumous affections in earlier, and pulmonary in later life, while some of the children may only have the muscular form of rheumatism, or the acute attack on joints. Some again may have cardiac disease without preceding rheumatism. In the course of phthisis rheumatic affections are frequent, oftentimes alternating with the more active chest symptoms, and for the time suspending the progress of the lung disease.

Rheumatism in the course of phthisis.

Its character.

The rheumatic attacks in phthisis are not of the extreme severity which we witness in uncomplicated rheumatism. Acute inflammatory affections of

the heart are also rare, and the case generally yields in a shorter time than usual to ordinary treatment. At the close of such an attack, or shortly after, the chest symptoms resume their activity, and the case its ordinary aspect. After a time repetitions of the rheumatic attacks may occur, and much enfeeble the patient.

Tubercular disease slow.

But the progress of the pulmonary affection is on the whole slow, and the distress great. A prognosis for long duration may therefore be generally offered.

Age.

Sex.

The age at which this complication with phthisis is most common is from 20 to 35, and the male sex is more likely to be its subject than the female; for out of 142 instances, 92 were males. I have thrown the leading features of these cases into a tabular form, showing the nature of the affections present, and the predisposition.

Of cases of rheumatism, disease of the heart, or gout, combined with phthisis, I observed 142 examples occurring in a total of 4,530 cases.

	No. of cases.		No. of cases.
Rheumatism before phthisis	49	Hypertrophy . . .	3
„ after „ .	18	Intermittent pulse . .	5
Disease of heart only, without rheumatism .	54	Valve not stated . . .	3
„ Mitral valve . .	38	Gout	7
„ Aortic „ . .	35	Predisposition to phthisis .	20
Dilatation and Degeneration	23	„ to rheumatism .	3
		„ to disease of heart	1

The ages of the seven cases of gout with phthisis were two aged 40, and five between 40 and 50.

It will be seen from this statement that, as a disease preceding phthisis, rheumatism holds a prominent place; and remembering that all affections of an acute nature are very rarely seen in the course of consumption, it is impossible to avoid the conclusion that the two diatheses are closely allied. Theoretical considerations, and especially that which points to an excess of

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fibrin as a characteristic of both disorders, corroborate this view.

Disease of the heart.

Disease of the heart, whether of the walls or valves, is by no means an unfrequent concomitant of phthisis; it is often found where acute rheumatic inflammation has been the exciting cause; and it may fairly be doubted whether the rheumatic constitution does not often induce thickening of the valves as a slow chronic result of the diathetic temperament called rheumatism. In 54 instances of disease of the heart with phthisis, there had been no previous rheumatic attack. The disorders of the mitral valve were slightly in excess of those of the aortic. Dilatation of the cavities of the heart was far more frequent than simple hypertrophy.

Influence on phthisis.

The antagonism of both of these conditions of the heart to phthisis has been repeatedly stated; and in the case of dilatation, the assumption is, that whatever tends to induce venosity of the blood opposes the development of tubercle.

Hypertrophy has been often asserted to be equally antagonistic, but the reasons have not been thrown into the form of a theory to account for the result.

Experience proves that both of these conditions retard the progress of tubercle, and a prognosis for length of duration may safely be offered. Almost all the cases of this combination which I have witnessed have been slow, and the tubercular disease has not advanced to that extreme disorganisation of both lungs which is the common end of ordinary phthisis. Death has generally taken place rather from the cardiac than from the pulmonary disease.

Hereditary tendencies.

It is to be remarked that in these mixed cases the hereditary predisposition is rather to phthisis than to rheumatism, and that the parent may have one disease and transmit the other.

Gout.

Gout and rheumatism are so allied to each other in their pathological development, that they may well be

considered together in their influence on phthisis. The children of gouty parents, especially if the latter be aged, are often phthisical; and not a few consumptive patients have attacks of gout. The above table gives only seven instances out of 92, but this table was constructed from out-patient cases. Since I have had charge of in-patients, I have met with many more instances of gout occurring in the phthisical, and of the alliance of the gouty with the tubercular habit. The identity of the arthritic with the tubercular constitution has been often argued, and lately views possessing much interest have been put forward by Dr. Gueneau de Mussy in favour of this hypothesis. He considers that, in many instances where gout is said to 'overleap' one generation and exhibit its effects in the next, the intermediate one is not free from gouty attacks, which are exhibited in scrofulous and tubercular diseases, and that females (supposed to be much exempt from gout) illustrate the inherited diathesis in various forms of tubercular disease. The same author doubts whether the calcareous transformations undergone in certain cases of tubercle do not belong to the gouty class of affections.

De Mussy's views on the arthritic diathesis.

Such theoretical considerations are worth attention, but the practical point remains, that gout, like rheumatism, when the specific attack of the disease is developed in a case of tubercle, retards the latter. During the gouty fit, the chest symptoms are mitigated, and a pause is gained in the advance of pulmonary disease. As in rheumatism, so in gout, when fever has subsided, and the urine is clear, an interval of 'convalescence' often occurs, after which a renewal of chest irritation may take place. On the whole, the character of these cases is long; but it is to be observed that they are not very amenable to remedies, and that cod oil often disagrees.

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Age and sex.

Table showing the Ages and Sex of 142 *Cases of Phthisis, with Rheumatism, Disease of the Heart, or Gout.*

	Males	Females	Total
Age 5 years	0	2	2
„ 10 „	3	3	6
„ 15 „	2	2	4
„ 20 „	17	12	29
„ 25 „	15	9	24
„ 30 „	15	9	24
„ 35 „	12	1	13
„ 40 „	11	5	16
„ 45 „	7	2	9
„ 50 „	3	2	5
„ 55 „	3	1	4
„ 60 „	2	1	3
„ 65 „	1	1	2
„ 69 „	1	0	1
Totals	92	50	142

Thus, at the age of 5 years, 2 cases occurred, both of which were females, &c. &c. As before stated, the cases of gout were in individuals at or over 40.

Duration.

The duration of these cases, while under observation, was as follows:

25 cases lasted for	.	6 months	
20 „ „	.	1 year	
22 „ „	.	1½ „	
10 „ „	.	2 years	
4 „ „	.	2½ „	
4 „ „	.	3 „	
7 „ „	.	3½ „	
2 „ „	.	4 „	
2 „ „	.	4½ „	
1 case lasted for	.	5 years	
4 cases „	.	5½ „	
0 „ „	.	6 „	
0 „ „	.	6½ „	
0 „ „	.	7 „	
1 „ „	.	10 „	
1 „ „	.	12 „	
39 „ lasted for indefinite long periods.			

The average duration of these cases, while under observation, was 23·30 months, the indefinite period cases not considered.

On leaving the hospital, there were:—

Better	47	
Worse	36	of whom 11 died.
Stationary	59	

Of these cases, 51 were in the first stage, 60 in the second, and 31 in the third stage of phthisis. Of the deaths, 1 occurred in the first stage, 5 in the second, and 5 in the third stage.

Characters of these cases.

The cases which unite the features of rheumatic heart disease, and tubercle in the lung, present several peculiarities.

Hæmoptysis.

A rather profuse hæmoptysis frequently is the first symptom of lung disease, and throughout its whole course recurrence of hæmorrhage is common. Nor is it always dependent on the pulmonary congestion secondary to mitral narrowing, for it is witnessed in aortic thickening and in simple dilatation. So common is this, that the hæmorrhage diathesis has been supposed to attach itself especially to this combination.

Left lung commonly affected.

The left lung is most frequently affected, and the exudation is massed and somewhat circumscribed at the apex.

Diffused tubercle rare.

A cavity is generally formed, this form of tubercle being rarely disposed in the sparse diffused variety which we have described. The exudation is probably more fibrinous, and possesses more of the rheumatic element than ordinary tubercle. Laycock * asserts that it breaks down into a less regular excavation than is common. The infiltration of inflammatory products around the tubercular deposit is undoubtedly greater than in ordinary phthisis. The contractility of such products, and possibly the tendency of the tubercle itself (which is more commonly of the grey variety) to retrograde changes, gives rise to great flattening and retractation of the chest walls in cases which become somewhat chronic.

Flattening of chest walls.

For the same reason the heart is frequently displaced upwards, the pulsation being very manifest to the eye and touch in the third or even in the second intercostal space. We have thus a succession

* 'Lectures on the Physiognomical Diagnosis of Disease:' *Med. Times and Gazette*, May 3, 1862.

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of physical signs from above downwards, very characteristic — a cavity under the clavicle on the left, with retractation of the chest walls and the heart immediately underlying it, with such murmur as belongs to the peculiar lesion of which it may be the seat.* On examining such cases after death, the irregular, contracted cavity, with much inflammatory infiltration of the lung surrounding it, as well as in other parts, will be found to form a characteristic morbid state. Very often there is almost no tubercle, the lung being contracted by fibrinous products which diminish its bulk, and render its tissue dense and unyielding. Cretifactions are not uncommonly found.

Life prolonged.

Practically, there is found to be a great tendency to longevity and prolongation of life in these cases. When the first severity of mischief is over and softening has occurred, the patient regains a certain amount of vigour and of flesh, the cough subsides, the secretion from the cavity lessens, and the pulse, although excitable, is commonly tranquil, often, however, possessing the thrill of mitral disease.

Clubbing.

The hand generally becomes most characteristic, and 'clubbing' of the fingers is almost invariable. The patient often remains free from all secondary disorder, as diarrhœa, for an unusual period. In some instances, this symptom never occurs. Repeated hæmorrhages are very apt to distress and to lower the strength, but they have their use, and relief to dyspnœa is very commonly the effect. Death may occur from the pulmonary or the cardiac lesion, but the ordinary extreme wasting of phthisis is not common. With extension of the deposit to the opposite lung, the breathing becomes much distressed, and the livid lip and nails of the sufferer evidence imperfect aeration of the blood. This symptom is very marked, and occurs long before the

Extreme wasting absent.

* See diagram page 199.

final break up. I have frequently seen death take place from cardiac obstruction, secondary anasarca, and œdema of the lung, but slowly and with much suffering. Great prolongation is the character of this singular complication of pulmonary and cardiac disease. Such are the symptoms, but their explanation is not so easy. Why should the left lung be the seat of tubercle more commonly than the right, when cardiac disease is also present? That peculiarity of nervous power which governs the distribution and locality of disease has been assigned as the agent directly influential in such instances as this; but while attributing this action to the sympathetic and par vagum, we are rather eluding than answering the question. The neighbourhood of organs (apart from their function), and even where their nervous supply is derived from different sources, often determines their implication in diseased action. Thus when structural hepatic disease is combined with pulmonary, it is the right lung which is commonly engaged. Professor Laycock has stated his opinion that the reason may be found in the anatomical relations of the left pulmonary veins, which lie so closely together that pressure upon one could hardly be made without involving the others, and 'conceives that this pressure may be made by enlarged bronchial glands.' But he is finally compelled to take refuge in the vagueness of a 'defect in the innervation of the nutrient and motor nerves.'

Phthisis 3. Mitral disease; hypertrophy; double cavities. 14 years.

V. C. æt. 23, Nov. 1860. Mother, two maternal uncles, and one paternal uncle died of phthisis. Ten years ago had profuse hæmopytsis, which has been repeated frequently since. She has also been subject for the same period to cough, with moderate expectoration. Is slightly wasted, and not losing flesh lately. Has had attacks of hectic, but there is no present fever. The pulse has a characteristic thrill. There is a chronic abscess connected with the hip joint, from which she has suffered from infancy. The limb is shortened; the discharge now very slight. Ctma. regular and sufficient.

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The hæmoptysis, which at times amounts to half-a-pint, is most common at the menstrual period. Urine natural. No œdema. Digestion good. Her principal distress arises from dyspnœa on exertion. She has never had rheumatism. *A loud systolic soufflet over the mitral region, and a distinct murmur, rough, systolic at the base. The heart is drawn up to the left side, and the cardiac dulness is extensive, the impulse increased. Very marked dulness, much retraction of the chest walls, and diminished mobility; gurgling, pectoriloquy, under the clavicle for three inches, and in the supraspinous fossa. Slight humid crackle over the base, posteriorly left. On the right side there is diffused humid crepitus over the upper third of the lung. The posterior inferior of the right lung is the only part where vesicular respiration is heard.* She was treated by tinct. ferri sesquichlorid.; gallic acid, 3 grains twice a day, sedative mixture. She improved very much, was able to walk some distance, took a part in teaching at a Sunday-school, and looked well. At intervals till January 1863 I attended her, generally on the occasion of a profuse hæmoptysis. At other times when she was much distressed by dyspnœa, without spitting of blood. On these last occasions I generally ordered a few leeches to the sternum, which caused immediate relief, a sense of giddiness under which she suffered being at once removed by this treatment. *At this time a well-defined cavity formed in the opposite lung. So that we had thus physical signs of two cavities and crepitation in all the other portions of the lung excepting in the right base, in addition to the cardiac disease.* It was only in the summer of 1864 that she gave up walking out, and was obliged to confine herself to the house. From the commencement of this year she had no further hæmoptysis, and her dyspnœa daily increased. She had to be carried up-stairs, but could walk down. Her digestion remained good to the last. *She never had any of the secondary effects of tubercle, as diarrhœa.* In November she was seized with agonising dyspnœa. I found her gasping for breath, face livid, lips purple, pulse nearly imperceptible and very rapid; *a coarse crepitus over the hitherto healthy right base.* Brandy in repeated small doses, alternated with ammonia and chloric ether, large turpentine fomentations to the chest and back, and

warmth with frictions to the extremities somewhat relieved her. At nights she was delirious, had no sleep, an intolerable orthopnœa rendering her sufferings very great. Notwithstanding the most unfavourable prognosis formed at this time, she again rallied. *The right base became clear*, the colour of the face much improved, and she became calmer and more collected. Slight anasarca of the lower limbs appeared to relieve the terminal part of the circulation.

In this revived condition, which from the medical warning given did not restore the hopes of her friends, she lingered a fortnight longer, and died on December 26, 1864, *without any paroxysm of dyspnœa, and without suffering. The heart's power had failed, and death was due to the cardiac rather than the pulmonary disease. The case thus lasted fourteen years, and during the last two she had double cavities in the lung, as well as the cardiac affection.*

The following points are worthy of remark :—

1. The marked predisposition to phthisis.
2. The modification of the tubercular by the cardiac disease. The latter consisted in valvular thickening and consecutive hypertrophy, a condition especially antagonistic to phthisis.
3. The completeness of the processes of sanguification, owing to integrity of the digestion.
4. The frequent relief from copious hæmoptysis, an indication which was followed with advantage by the local abstraction of blood.
5. Finally, the persistent vitality, which should never be forgotten in offering a prognosis as to time in cases of this nature.

CHAPTER XVII.

EMPHYSEMA OF THE LUNG WITH PHTHISIS. ASTHMA. CHRONIC BRONCHITIS.

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Emphysema an element of chronicity.

THE complication of phthisis with emphysema of the lung or with asthma is uncommon. These affections mask the tubercular disease as well as complicate it. It has been shown that emphysema of the lung is to a certain extent antagonistic to tubercle. When coexistent it is found in middle life most commonly; but their concurrence is extremely rare. In many cases it bears a very small proportion to the total number examined. In all it seemed to form an element of chronicity.

Two forms: compensatory dilatation of air-vesicles and true emphysema.

Two forms of the affection are to be recognised. First, that partial distention of the remaining sound air vesicles which occurs in certain cases of very chronic phthisis; and next, the true emphysema, which may have been a pre-existent or a concurrent affection with tubercle. These two varieties are often confounded; but they bear a different interpretation, both in their results on the lung, and on the case. We shall first consider the compensatory dilatation of the cells which occurs as a sequence to chronic phthisis.

Compensatory dilatation.

It is only in the most prolonged forms of phthisis that the air-vesicles become dilated, and then the increased respiratory spaces gained by amplification of the ultimate cells of the lung is only won after long-continued resistance of the system to a limited form of

the tubercular affection. Cavities in the lung long tolerated, and extensive deposit of the diffused character, on one side, are the conditions most likely to induce dilatation of the cells in the remaining and healthy portions of the lungs. In such instances the process of enlargement of the cells is scarcely a morbid action; but is, in its nature and results, in the breathing efforts which have caused it, and in the resulting defect in elasticity, a purely compensatory arrangement. The effort is toward prolongation. The system, to require such respiratory space, is of necessity not in the impaired position as regards circulating and oxygenating requirements, which is witnessed in the ordinary course of progressive phthisis. If much blood be circulating, and if that fluid be so well formed as to demand a frequent renewal from the atmosphere, the diminution suffered from an extensive deposit of tubercle is severely felt and lung space must be gained. A structure capable of dilatation to twice or three times its original volume, is distended to afford the necessary respiration; and the act is in its nature curative and restorative.

Physical conditions.

Not morbid.

The dilated air vesicles, in such cases, do not lose their elasticity to the same extent which is found in ordinary emphysema. The new space gained in the lung is, on the whole, good for respiration; and the exit and entrance of air is free. When this condition is found at the basis of the lungs, the tubercular concomitant affection has invariably been of long standing. The physical phenomena are not those of ordinary emphysema, viz., loud percussion note and deficient respiratory murmur; but while the resonance is preternaturally clear, the respiratory sounds are unusually loud and long. The prognosis in such cases is always good for time, the conditions being, in fact, such as indicate a tendency to rectify local mischief by increasing the remaining respiratory space, as well as affording evidence of the still-existing requirements of the system

No loss of elasticity in cells.

Prognosis good for duration.

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for air and circulation. The converse of this state is well seen in ordinary continuous phthisis, where the portions of lung, not the seat of the deposit, are congested, as indicated by the rough tone of respiration and occasional râles heard; and where the ultimate tendency, if the case be at all prolonged, is to contraction and shrinking of the lung tissue, and consequent diminution of the respiratory space.

Contrast with continuous phthisis.

Practical indications.

It may be well to notice here the practical indications which may be gathered from these considerations. To enlarge the remaining respiratory space if, in such increased distention, it can be made to maintain its respiratory powers, is a very manifest way to remedy the mechanical inconvenience resulting from an obliteration of a portion of the pulmonary area. To enlarge without securing the integrity of the newly-expanded respiratory membrane would be to add a new source of embarrassment to the patient. If we could at will cause true emphysema of the base of the lungs in a case of ordinary phthisis, we should doubtless give rise to infinite distress.

Such dilatation always slow.

In the few instances in which nature enlarges the air-vesicles, while maintaining their respiratory integrity, the process is one of extreme slowness, and it argues a limit to the deposit of tubercle, and comparative healthiness of the remaining portions of lung, as well as a cessation (temporary at least) in the constitutional tubercular disorder.

Exercise of lungs not to be forbidden.

It may therefore be fairly deduced, from a study of the natural processes, that a fair exercise of the lungs is not to be forbidden to patients in the above condition; and that where we find a limited amount of local disease, with physical evidence of the integrity of the remaining portions of lung, and a manifest subsidence of the systemic disorder, we shall do well to enjoin a due exercise of the lungs, as by reading aloud occasionally even by singing, but, above all, by the

most beneficial mode of all, horse-exercise at a rapid pace. The instances in which I have seen the dilatation of the healthy cells occur, with increased respiratory powers to the patient, have occurred in persons taking daily active horse-exercise in the open air, and I have often witnessed the greatest relief to dyspnœa obtained by a gallop.

Horse exercise best.

The dangers incurred are not to be forgotten. Hæmoptysis and pneumothorax are possible occurrences. We have all seen these disastrous events fatal. I have witnessed the latter in a young lady from combing her back hair, when a small superficial cavity gave way! But if our cases be properly selected, the contingencies likely to occur will be found as one to a thousand compared with the gain by a moderate daily exercise of the lungs, promoting circulation, respiration, muscular vigour, and a gradual extension of the remaining healthy respiratory space.

Dangers.

The true emphysema of the lung, that in which the air-vesicles have lost their elastic power, is a rare combination with tubercle. It has been considered antagonistic.* The condition of the pulmonary circulation, and the general venosity of the system, have been supposed to be agencies opposed to the tubercular diathesis. With the theory we have not here to deal. The practical point of the rarity of the combination with existing phthisis is undoubted. The contrasts are remarkable:—

True emphysema.

Antagonistic to phthisis.

Emphysema.	*Phthisis.*
Large rounded chest.	Flat long chest.
Antero-posterior measurements deep.	Antero-posterior measurements shallow.
Distension of respiratory space.	Contraction of respiratory space.
Hæmorrhage rare, and of venous blood.	Hæmorrhage frequent, of aerated blood.
Stasis of pulmonary circulation reacting on the heart and causing dilatation of its chambers.	Hyper-activity in the pulmonary circulation, heart feeble from atrophy.

Contrasts.

* 'Il y a une sorte d'antagonisme entre ces deux maladies (l'asthme et la tuberculisation pulmonaire) qu'elles paraissent s'exclure mutuellement

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Emphysema the earliest affection.

Asthmatic fits.

Physical signs.

Cardiac dilatation.

Symptoms.

Alternation of the two affections.

True emphysema, when coexisting with phthisis, will generally be found to have been the earlier affection.

The occurrence of asthmatic fits from childhood, with recurring attacks of bronchitis and ultimate deposition of tubercle, is the ordinary history of such cases. On examination, the ordinary build of emphysema will be evident, and the ordinary physical signs of fixity of the chest walls. Loud percussion note, and feeble respiratory murmurs will be present. One apex, or both, may also furnish the signs of deposit in the lung in the first stage, or in that of softening or cavity. The asthmatic paroxysm is present, often to an extreme degree of distress, such, indeed, as is rarely seen paralleled in any pulmonary affection.

The lung disease is slow to advance, but the cardiac dilatation, inevitable in prolonged cases of emphysema, increases with time, and finally rises to be the most destructive element in the case.

As these cases of conjoined asthma and tubercle develop themselves, there is a curious mixture of the symptoms peculiar to both. Should the asthmatic affection have preceded the other, the seizures no longer remit, but the dyspnœa becomes, as it were, continuous, while the physical signs of deposit in the lung supply sufficient evidence of the cause. The pauses which are so common in the tubercular disease are often occupied by the asthmatic paroxysm, and the two affections seem almost to alternate. Should tubercle have been the earlier affection, its advance is steadily retarded from the moment that fits of dyspnœa occur. Not only is phthisis thus held in check, as it were, but

dans certaines races prédisposées à leur double atteinte : que, chez le même sujet, le développement de l'une semble enrayer ou affaiblir la marche de l'autre.' (De l'Influence réciproque de l'Asthme et de la Tuberculisation pulmonaire. Par Dr. N. Gueneau de Mussy, Médecin de l'Hôtel-Dieu : *Arch. Gén. de Médecine,* Nov. 1864, p. 513). See also Williams (*Prin. of Med.*), Rokitansky, and others.

the various secondary disorders, as well as the more ordinary manifestations of disease, are interfered with.

Sources of error.

The physical signs require to be studied with great care. The emphysematous state of the lung may mask the dulness on percussion, the sonorous râles so common in asthma disguise the fluid gurgle or soft crepitant sounds of tubercle, and the ordinary loud harsh and prolonged expiration of the former may wholly overcome the same phenomenon referable to a deposit in the lung. A careful comparative estimate of the sounds at the two sides is highly necessary, and an equally careful investigation of the patient's history and family antecedents can alone save us from error.

Prolongation.

The conjoined affection is greatly prolonged. The body wastes often to an extreme, but hectic is not severe, and secondary diarrhœa is rare, and does not kill as in ordinary phthisis. We are often surprised to witness the length to which these cases are prolonged, and as the suffering from dyspnœa is extreme, there is, perhaps, in the whole range of disease no affection more painful to witness. Unfortunately a prognosis for prolongation may be given.

Death from failure of heart's action.

Death finally occurs from failure of the heart's action. The respiratory death is rare. These cases appear to lie on the limits of bronchitis and phthisis, and to partake of the aspects of both.

Age that of chronic bronchitis.

The age at which the complication presents is more that of bronchitis of the chronic form than of phthisis. The predisposition may be either to tubercle or to asthma, but rather to the former. In the dyspnœa, and its recurrence in fits, in the shape of the chest, and in the nature of the expectoration, we recognise rather emphysema than phthisis, and in treatment the cases respond to the remedies for the former affection. On the other hand, the hæmoptysis (when present, as it generally is), and the progressive wasting, lend an unmistakeable character, even without physical signs, of tubercle. In viewing the chronicity which is often

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accorded to these cases, we are tempted to ask whether the emphysema does not compensate for the respiratory space lost by the tubercular deposit? It is certain that the phthisis does not advance as in other cases. Cavities do not form and extend, nor does the disease develop itself with activity and rapidity in the opposite lung, nor do secondary affections intervene. That terrible monopoly which consumption appears to exercise over the system, excluding all diseases but itself, is interfered with, and although an additional cause of distress be added to the patient, he does not so rapidly sink under the double as he would have done from the single ailment.

Phthisis retarded.

Average duration.

The average observed duration of the complication of phthisis with emphysema and bronchitis, was found to be 49·24 months, which is more than three times that of ordinary phthisis.

Chronic bronchitis with tubercle.

Bronchitis has been grouped with emphysema in this section, from the frequent combination of the two affections, whether with or without phthisis, but it need scarcely be said that bronchitis is often found as the companion of tubercle without any amount of existing emphysema. It is chiefly in aged persons that bronchitis is found as the direct forerunner of the tubercular disease. In them it often masks the latter for months or years. In a sense, bronchitis is never absent from any case of phthisis at any age, but it is especially the concomitant of the senile form.

Diagnosis obscure.

But there are also cases in which the cough, the expectoration, and the febrile remittent character of the symptoms, combined with very considerable loss of flesh, lend a character to the disease which is scarcely distinguishable from phthisis. The physical condition of the chest may also be not so absolutely decided as to warrant an authoritative opinion. On the supposition that it is phthisis, the chest signs are of too diffused a character to permit of the localisation so character-

istic of tubercle. Viewed from the side of bronchitis the signs are too condensed, and the presence of some dulness on percussion may, without tubercular disease, lead an unskilled observer to believe in consolidation rather than inflammation. And when we come to regard closely the history and signs of such cases, when we remember that there is but a step between capillary bronchitis and pneumonia, and often a doubtful division between pneumonia and tubercle in the lung, we shall see cause to view our most approved tact with diffidence. In truth, these are what they appear, cases of a very mixed character, and accuracy is alone to be ensured by remembering that our differences in nomenclature are not always borne out by the structural varieties which our names represent.

In the following cases, selected from large numbers, as presenting a distinct combination of bronchitis or emphysema with phthisis, careful observations were made.

Predisposition to tubercle more marked.

Emphysema well marked existed in nineteen cases. In these the predisposition was ascertained in fifteen cases, and it was found that twelve had inherited tendencies * to phthisis, and only three to asthma.

Stage.

As regards bronchitis combined (in its severer forms) with phthisis, there were 77 cases observed. Of these 27 were in the first stage, 49 in the second, and 1 in the third stage of consumption. Forty-four had bronchitis before phthisis, two had unmistakeable symptoms of phthisis first; and in 31 it appeared doubtful which of the two affections had the priority in point of date. The following table shows the ages and the stage of phthisis :—

* This would seem to contradict the experience of Dr. de Mussy (*op. cit.* sup.), who considers that the predisposition to asthma is always most marked.

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Ages and stage.

	Nos.	Stage 1.	Stage 2.	Stage 3.
Age 25	9	6	3	0
„ 30	11	5	6	0
„ 35	10	3	7	0
„ 40	15	6	9	0
„ 45	11	3	8	0
„ 50	9	3	6	0
„ 55	5	0	4	1
„ 60	7	1	6	0
Totals	77	27	49	1

The table reads thus: at 25 years of age 9 instances presented, of which 6 were in the first stage, and 3 were in the second, &c.

Duration.

The duration while under observation was as follows:

	Cases.		Cases.
For indefinite long periods	29	For 5 years	4
„ 6 months	1	„ 6 „	6
„ 1 year	5	„ 7 „	3
„ 1½ „	2	„ 8 „	1
„ 2 years	3	„ 10 „	6
„ 2½ „	5		
„ 3 „	5		77
„ 4 „	7		

It will be remarked in the above table how great was the duration of this class of case. In fact, scarcely any of them fall within the category of ordinary phthisis, which runs its course in eighteen months. The age is rather that of bronchitis in its chronic form, than of phthisis; and the cases partaking of a mixed character observed that law of tubercle that *every agent capable of converting it from its usual course, adds prolongation to its term.* The state of health of 59 patients was observed when they passed from under observation, with the following result:—

Law of tubercle exemplified.

Improved	22
Stationary	18
Worse	19
Total	59

Case. Bronchitis, emphysema, phthisis, m. cordis, under observation 7 years.

Oct. 1857.—Mrs. O. æt. 35; no known predisposition to either asthma or phthisis; has 3 healthy children, youngest 13. Has been subject to cough for four or five winters, now continuous cough for one year, with frothy, difficult expectoration. One slight hæmoptysis three weeks ago. Very considerable loss of flesh and strength lately. Dyspnœa on exertion. Pain in left side and scapula. Digestion pretty fair. Ctma. regular. *Chest emaciated, movements impaired both, flattening left anteriorly; dulness and humid crepitus over whole left.* December.—An acute attack of asthma, with excessive dyspnœa, sonorous râles over both chests; pulse not affected in the attack. Extremities were cold; chills excessive; no sweats. The following summer she rallied, but the winter brought exacerbations, chiefly of the asthmatic form, which increased in severity year by year. *A cardiac, mitral, systolic murmur, faint but pronounced, with heart sounds diffused over a wide extent, and the same pulmonary signs as before, were noted in June* 1860. At this time she became much emaciated, without any advance in the physical signs, and without any fever. Her attacks of dyspnœa increased both in frequency and severity. The greatest relief from these paroxysms was now experienced from the use of morphia in doses of one-eighth of a grain. In July 1862 she was much emaciated, the physical state of the chest, *as regarded the tubercle, had not advanced, but much emphysema of the bases of both lungs was manifest.* Her life had been one of greatest suffering. In her paroxysms of dyspnœa she has lain for three weeks in a prone position, without the possibility of moving, and with all the accumulated miseries which such a state of things involved. The slightest movement brought on the most distressing dyspnœa. Her cough at this time was chiefly in morning and evening hours, and was followed by a considerable expectoration of muco-purulent matter. Her nourishment was taken chiefly in the fluid form, and in small quantities. Stimulants often relieved her, and up to the time of her death in June 1864 she never left off taking morphia, of which she generally consumed 3 grains in the day. Remedies of the antispasmodic kind were on the whole the most efficacious, next to morphia. She died after much suffering, and without any advance in the physical signs.

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Her intellects were unimpaired to the last. Death took place from gradual atrophy, and failure of the heart's action, without diarrhœa, or suffocative effusion into the tubes.

In this case the predominance of emphysema over the tubercular affection, the gradual supervention of dilatation of the cells, and the complication of dilated heart, together with the excessive dyspnœa and final result from failure of the powers of circulation, are very remarkable and typical features of this combination of disease.

Case. Emphysema with subsequent tubercle: 6 years.

J. M'C. æt. 41, shipwright, (kindly sent to me by Dr. M'Donough, of Sheerness). No predisposition to pht.; cough for 6 years; worse and continuous last 2 years; with lately hæmoptysis; loss of flesh and strength; considerable expectoration and night sweats; *dulness and flattening, humid crepitus left apex for some inches, with emphysema of both bases; worse at night; feeble action of heart.* Improved much on sedatives and anti-spasmodics, with counter-irritation.

Case. Asthma from childhood, phthisis in adult life.

E. C. æt. 27, mother of 3 children. Fits of dyspnœa once a week since childhood; more frequent lately and at catamenial period. The dyspnœa lasts one day, when it is ended by a prolonged fit of coughing, with moderate yellowish white expectoration. On these occasions she has hæmoptysis, florid, mixed; lately there is loss of flesh, with night sweats; bowels flatulent always before the attack; *dulness, with tubular respiration of a dry character and crepitus at left apex for some inches.* The case was under my care for 2½ years. The treatment found to be most efficacious was an emetic of ipecacuan when the attack was impending, and full doses of quinine in the interval. Asafœtida and aloes in the form of pills was also found useful. The phthisical symptoms did not advance, nor did the signs change.

Case. Emphysema, bronchitis, phthisis.

R. R. leadshot maker, æt. 36, sister died of phthisis. Ill 3 years, and was in-patient 2 years ago, when he gained 21 lbs. in 3 months. Lately his cough and expectoration much increased; no hæmoptysis; much wasting; *dulness and moist crepitus right apex; rest of lungs emphysematous and with bronchial râles.* Improved much on mist. æther. chlor. and pil. stramonii, with acetic acid liniment externally, and afterwards on mist. senegæ.

Case. Asthma 18 years, deposit in lung.

Sarah O. æt. 42, housemaid. Subject to fits of dyspnœa for 18 years, followed by cough and expectoration; no hæmoptysis; has lately begun to lose flesh and strength; ctma. regular; digestion bad; *dulness and clicking at both apices well marked.* Improved on stramonium and chloric æther with counter-irritation.

Bronchitis, phthisis hereditary.

Charles A. æt. 23, clerk, 2 brothers and 1 sister died of phthisis. Ill 2 years with cough of bronchitic character; for the last 6 weeks hæmoptysis, with increase of cough, and difficult expectoration; *dulness, flattening, impaired mobility, rough and blowing resp., with exp. prolonged right apex*; *diffused bronchial râles both bases.* Treated for 1 year by oil and sedatives, with external application of iodine; got worse slowly.

Case. Phthisis rapid at first; cardiac dyspnœa, death.

Mrs. T. æt. 56, Feb. 1862. Ill for some months; no predisposition; no hæmoptysis; excessive dyspnœa on exertion; constant cough and expectoration; moderately wasted, no present hectic; digestion unimpaired; *dulness, flattening, gurgling*; *subclav. diffused*; *humid crepitus to the base anteriorly and posteriorly left*; *humid crepitus anterior and posterior parts of apex right*; *systolic murmur at base.* This lady's dyspnœa increased, but the tubercular affection remained stationary. There was neither fever nor diarrhœa, and she died in the spring of 1864, of gradual dilatation of the heart.

Prognosis.

Cases of compensatory dilatation long.

The prognosis in the class of cases presenting compensatory respiration, and the evidence of enlargement of the healthy portions of the lung in phthisis, must be invariably good for duration. Nature has already made a vigorous resistance to disease, and the battle will be a long one, even if the fight be severe.

Asthma and tubercle long.

In phthisis, when found combined with the asthmatic paroxysm and true emphysema of the lung, the case is certain to be a long one, and an opinion favourable for time may with confidence be delivered, if no cardiac affection be present. If dilatation of the cardiac chambers be present, the distress will be great, but the case will still exceed the ordinary limits of phthisis.

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In the case of compensatory dilatation of the cells, the tubercular is the primary affection; in emphysema the asthma almost always precedes the phthisis. The former is likely to be the longest in duration. Bronchitis of the chronic form, combined with tubercle in the lung, tends to the chronicity of both affections, and the case will be a long one.

Chronic bronchitis, phthisis.

CHAPTER XVIII.

MENSTRUATION—PREGNANCY—LACTATION.

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Influence of menstruation on phthisis. Puberty.

THE influence of the catamenial function on phthisis in its development and progress, has been held by many authorities to be considerable. The commencement of phthisis at the age of puberty, and its association with the absence or incompleteness of the uterine function at that time, have appeared to stand in the relation of cause and effect, and amennorrhœa has been regarded and treated remedially as the exciting cause of the tubercular affection. It has often been attempted to restore uterine activity, in order to cure or prevent the consumption.

Arrest of nutrition.

It seems, however, far more reasonable to attribute the suppression of the catamenia to the constitutional disorder of nutrition, which is alike the cause of the suppressed secretion and of the phthisis. The earliest features of tuberculosis are arrest of development and emaciation, and the uterus only shares in the general want of functional activity undergone by all the organs. Were the suppression due to a local congestion of the generative organs, the symptoms would be different, as a general state of plethora is known to prevail in such cases. But the nature of the amennorrhœa is manifest. There is want of nervous organic power, and deficiency of circulation. Neither the quantity nor the quality of blood are equal to the requirements of the system at the age when the frame should expand,

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when growth takes a new impulse, and various important functions dependent on full organic development have to assume a new activity. The causation should here be reversed, it is tuberculosis which gives rise to the suppression of the uterine secretion, and not the amennorrhœa which causes the phthisis.

The age of puberty is perilous to growth if organic life be not in full activity, and in those hereditarily predisposed to tubercular disease is the second great period when an invasion of the latter is to be apprehended. During childhood, mesenteric, cerebral, and external glandular affections predominate, at puberty pulmonary disease is threatened; and although, as has been shown, consumption does not necessarily attack the predisposed at this time, yet many fall victims to its ravages at this critical age. The great wave of tubercular disease doubtless attains its greatest intensity at from 25 to 35, but the grave error of nutrition of which tubercle is the expression, finds an impulse of development when bodily growth should be in the highest degree of activity. At puberty not only is growth active and rapid, but nervous power is intensified, and organic life becomes very susceptible of derangement. At the moment of greatest activity in blood-making and tissue-formation, errors in the quality of the plasma are speedily felt by the respiratory system. We cannot for a moment believe, that the retention in the blood of that which goes to form the healthy uterine secretion, has anything to say to the formation of tubercle, but the error in nutrition of which the latter is the expression, is doubtless extended to the uterus and ovaries in common with the other organs of the body. That an improvement in health should occur, or an arrest in the tubercular disease take place coincidently with the establishment or reappearance of menstruation, is only in accordance with this view. In all instances in which we have

Amennorrhœa not a cause of phthisis.

seen such coincidences, an amelioration of the chief symptoms, an arrest of the emaciation, and a pause in the febrile action, has preceded the restoration of the catamenia.

That a large number of cases of phthisis commence at the age of puberty is a well-ascertained fact. To prove that the establishment of the uterine function has a direct relation to phthisis, it would be necessary to show that more females than males are affected by pulmonary consumption at the age of puberty. Out of 300 cases of strumous phthisis, I had 59 males and 56 females between the ages of 10 and 15. In 59 instances of incipient phthisis (all ages), there were 19 males and only 4 females between the ages of 15 and 20. In phthisis occurring in the rheumatic diathesis between the ages of 15 and 20, there were 19 males and 14 females. In 179 cases of acute phthisis, 26 males and 16 females were attacked between the ages of 15 and 20.

More males than females phthisical at the age of puberty.

From the above observations it would appear that there is a large preponderance of males over females (123 of the former to 90 of the latter). The more rapid and acute form of phthisis also shows a majority of males at this age. It is then the age and not the sex, and the general functions of growth and increased activity of the nutritive processes, to which we are to look for the exciting causes which render the period of puberty perilous.

Passing to other considerations connected with this subject, it will be asked in what respect does the cessation or continuance of the catamenial function influence the progress of phthisis when established?

The progress of phthisis influenced by menstruation.

The following statement gives the result of observations on 99 cases in which the menstrual function was irregular, absent, or excessive. The stage of phthisis is also given in relation to these points:—

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	No. of cases.
Stage 1.	
Catamenia, irregular or deficient, in	1
„ absent „	14
„ excessive „	2
Stage 2.	
Catamenia, irregular or deficient, in	2
„ absent „	16
„ excessive „	1
Stage 3.	
Catamenia, irregular or deficient, in	7
„ absent „	28
„ excessive „	1
Total	72

In 27 cases examined the catamenia had never appeared. They are arranged below according to age, and the stage of disease :—

	Age.						
	13	14	15	16	17	18	20
Phthisis 1	1	0	3	3	0	0	1
„ 2	1	0	2	2	0	0	1
„ 3	0	2	4	5	1	1	0
Totals .	2	2	9	10	1	1	2

The above table reads thus: At the age of 13 the catamenia had never appeared in two instances, one of which was in the first and the other in the second stage of phthisis.

On leaving off treatment at the hospital the following results were noted in 76 cases :—

	No. of cases.
Catamenia absent.—Improved or stationary	46
„ „ Worse	14
Catamenia deficient or irregular.—Improved or stationary	7
„ „ Worse	1
Catamenia in excess.—Improved or stationary	3
„ „ Worse	5
Total	76

Average observed duration.

The average duration while under observation of this class of cases in which the catamenial function was

much interfered with in the course of the phthisical disease was ascertained to be 21·71 months, which is a low figure.

The above figures are taken from cases selected as presenting catamenial irregularities, and do not represent average occurrences in phthisis. They are, therefore, illustrative rather than demonstrative. It would appear from them that the uterine function is most commonly absent altogether, or simply regular; and that its absence is, in many instances, consistent with much improvement in the disease, and very frequently with the stationary aspect of phthisis. But on the whole amennorrhœa is a bad symptom, which is rarely absent in the advanced stages of the disease. From general experience, difficult to state in a tabular form, I should offer the following

Prognostics.

Prognostics.

1. A rapid invasion of phthisis may be dreaded when the disease is hereditary, and attacks at the age of puberty in either sex.
2. Tuberculosis delays or wholly puts a stop to uterine regularity at the age of puberty in females.
3. The establishment of this function is often attended by relief to the tubercular disease, and its persistent regularity is a good sign.
4. The permanent arrest of menstruation in phthisis is a very common occurrence. This event is preceded by much exhaustion of the system and vital powers, and is a bad prognostic.
5. When menstruation is pretty regular in a phthisical patient, all the symptoms are liable to undergo an increase at the monthly period.
6. When menstruation is suddenly checked, a hæmoptysis is a frequent event, and may be regarded as vicarious, and with less import of

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pulmonary mischief than under other circumstances.

7. In very chronic first or second stage cases, without fever, the catamenia are often absent altogether. In such cases a resumption of the uterine function is preceded by a higher sanguification, and is a good prognostic.
8. In very chronic cavity cases of the anæmic variety the absence of the catamenia is not a sign of bad omen, the system living, as it were, at a low average, and all vital functions being economised.
9. In chronic cavity cases, where the system has recovered to a considerable extent the injury suffered, the regularity of this function is a positive sign of vigour, and an essential element in a favourable prognosis for time.

Pregnancy.—Lactation.—Phthisis.

Pregnancy, danger at this period of hereditary tendencies.

In the chapter on the premonitory stage of phthisis are given some details showing the influence of pregnancy and lactation as proximate causes of the disease. If the hereditary taint be present, these events of female life are fraught with peril. The age at which transmitted phthisis develops itself is either at the strumous period, or from 20 to 30, and in females who pass through the first epoch, the disease is rarely delayed beyond the second. If strumous children are not swept off before 20, the generative period is most likely to bring pulmonary consumption. Apart from sexual considerations, this is also the age at which phthisis, in both males and females, begins to be most prevalent. Phthisis may either be present before pregnancy, or commence during gestation, or at the time of delivery, or soon after.

The phthisical age nearly that of pregnancy.

Disease commonly quiescent

From a careful examination of a large number of cases (234), it is concluded that the disease was in a

latent form during or shortly before pregnancy in the great majority, and that it received an acceleration from the time of confinement. The period of gestation is comparatively one of latency, or rather of quiescence of the symptoms. However rapid the form of phthisis which is present, the patient survives to the time of labour, and the instances are quite exceptional in which the mother dies undelivered.*

during pregnancy.

Patient generally is delivered.

The ordinary course is that all the symptoms assume increased urgency from the time of labour. The hectic becomes severe, diarrhœa or laryngeal disease begins and rapidly exhausts the patient. Sudden death may occur from the shock of delivery, or even an ordinary amount of hæmorrhage may prove fatal by causing collapse. Of course, any great loss is additionally perilous. In such cases the patient, blanched, anæmic, and exhausted, may succumb within a week or two from diarrhœa and hectic. The disease is in almost every instance increased, and the danger incident to the time of labour must never be overlooked in our prognosis. Old cases of cavity in the lung, or chronic long-tolerated disease, will also often break up at this period, but it does not follow that this will be the invariable sequence, for in numerous instances these patients survive many confinements. The truth, however, remains that the actual period of delivery is one of unusual peril, and that very prolonged cases of consumption often break up at this time. The danger, however, attaches itself eminently to the rapid continuous form of the disease. And it is for such cases that an invariable prognosis of peril must be offered by the attendant. In 232 cases of phthisis complicated by pregnancy,

Symptoms become urgent after labour.

The shock of delivery; hæmorrhage.

Old cases may break up.

The form of phthisis often acute or continuous.

* One of these most painful events occurred in one of my wards, and in my presence; but both Mr. Edwards our Resident Surgeon, my clinical assistants, and myself, were satisfied that there had been no evidence of life in the fœtus for twenty-four hours previously.

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79 cases were in the 1st stage of phthisis.
74 „ „ 2nd „
79 „ „ 3rd „

Six died while under my care, all in the third stage, of whom one had been ill for 6 months, 3 for 18 months, 1 for 2 years, and 1 for 5 years. Taking all the cases together, the average duration to be assigned to each case was 19·39 months, which is exceedingly low (see table of duration). In 5 instances, the cause of the invasion of the disease appeared traceable to excessive hæmorrhage at labour.

Average duration.

Hæmorrhage a cause.

Lactation a cause.

The influence of lactation as an exciting cause of phthisis has been noticed before (p. 85), and a table has been given of the number of cases which commenced at this period. As a causative agent there can be little doubt of its influence, and its effect on the progress of consumption already declared must be considered as prejudicial in a marked degree. If pregnancy retard the course of phthisis, lactation accelerates it. Out of 189 cases, the disease was manifestly increased in 92 instances, and only in one or two could it be fairly said that the pulmonary disease remained stationary!

Lactation accelerates the disease.

Nor can it be said that excessive lactation is the chief danger in persons of the phthisical habit, but lactation at all. Out of the above 189 cases, only 14 had nursed longer than 1 year. It is manifest, therefore, that the drain caused by even a few months' nursing is highly dangerous in those predisposed to consumption. The preceding confinement has already reduced the system, and left it, as we have seen, most liable to an invasion of tubercle; and if at this time a new function which draws heavily on the nutritive powers be undertaken, the chances are that a rapid form of disease will be induced. The rule, therefore, ought to be imperative that mothers already in consumption, or threatened with that affection, should not

Consumptive mothers should not nurse.

nurse. The health of the child is also concerned in the question; for, although the mother may have an abundant supply of milk, it is seldom of a nutritive quality, and the infant wastes from want of proper food. That the germs of tubercular disease (already hereditary in this case) may thus be increased is self-evident, as such children generally die early.

Children die early.

Many consumptive mothers date the commencement of their illness from the weaning period. In the above cases, 16 out of 189 did so, and doubtless this is a time of grave peril. In such cases, the catamenia never return, or one or two changes only may take place. The prognosis is bad, the disease is generally of the rapid, intractable form, the fever continuous, and the local disease without limit. There is, perhaps, more severe hectic in this class of patients than in any other.

Catamenia do not return.

Prognosis bad.

The ages of persons affected by pregnancy or lactation are given below. From 25 to 40 is the prevalent period; but, as a large number of marriages are contracted in this country between those ages, the table has not much value as bearing on phthisis.

Age.

Ages.	No. of cases.	Ages.	No. of cases.
18	1	40	35
20	4	45	5
25	41		
30	87		
35	61	Total	234

CHAPTER XIX.

HÆMOPTYSIS.

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Symptoms.

To assign a special value to each individual symptom of consumption would be to adopt rather an empirical than a rational view of the disease. Regarding the affection as a constitutional disorder, rather than the manifestation of a merely local alteration in the organs in which it is seated, we must look further than to such symptoms as are dependent on structural disarrangement. All the knowledge which can be gathered from physical changes is to be added to and compared with the evidence of systemic variations from the standard of health. The sum of the two sets of observations is an indication of the present state of the patient, and an application of our acquaintance with the higher problems of the laws of vital phenomena to this ascertained condition, forms the basis on which we are to construct a rational prognosis. But there is also a certain knowledge of the nature and bearing of particular symptoms, always demanded by the patient, which is of real importance in the formation of a prognosis. We cannot sever these symptoms from general vital conditions, but we can assign to them a peculiar value, and are often enabled, if truly informed as to their meaning, to relieve apprehensions on the part of the sick, or to strengthen our own views as to the nature and probable course of the affection. Remembering that these hold a position of subordinate

Cannot be regarded alone.

True value relative.

importance to the signs which are of a more general character and have their chief value as interpreters of systemic disorder, their study will be found valuable in practice, and a perfect knowledge of their meaning will greatly assist us in estimating the progress of any given case. In this relation, an examination of the most prominent will be found interesting. It is proposed to record the result of many observations on hæmoptysis, and on alterations in the digestive system, as among the chief of this class of symptoms.

Hæmoptysis most common in 1st and 3rd stages.

Hæmoptysis is common to all stages of phthisis, but especially remarkable in two. In a great number of cases it marks the very beginning of tubercular disease in the lung, and it is a very ordinary symptom of the third or stage of cavity. Again, in many instances it is present in a slight form throughout the whole course of the affection, or it marks the period when softening begins, indicating the passage of the disease from the first to the second stage.

In first stage due to congestion.

Its course, and therefore its import, is different in each of these instances. In the first or earliest stage, when a deposit of tubercle is taking place, and before local injury to either blood-vessels or the bronchial membrane, it seems to be a congestion resembling local pulmonary apoplexy, and generally consists in a sudden rather profuse effusion, to the amount of some ounces of pure florid blood, and is accompanied by flushing, dyspnœa, pain in the chest, and hard rapid pulse. A careful observer will be able to detect dulness of the percussion note of the clavicular region of one side, while much harshness of the respiration murmur, and a fine crepitus caused by blood in the smaller air-tubes will be manifest.*

The hæmoptysis caused by excavation of the lung is

* Much physical examination of the chest at this period is inadmissible. It will be well to abstain from percussion.

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In 3rd stage.

also not unfrequently profuse, and of all the forms is alone ever fatal 'per se,' an event which is due partly to the effusion proceeding directly from a tolerably large vessel, and also from the already exhausted condition of the patient, whose general strength is much less tolerant of the loss of blood, owing to the impoverishment of the system from the blood disease, and to the emaciation of all the tissues, including the muscular structure of the heart itself. It is manifest that these two cases of loss of blood differ materially. The first is, or resembles, a congestion, occurring before the constitution has suffered from the wasting effects of disease, and is felt by the system as a relief, evidenced by the subsidence of dyspnœa, and of pain, which commonly follows its appearance; the latter is a hæmorrhage mainly due to mechanical local causes, and is only a further drain on a system already weakened by profuse expectoration, sweating, and alterations in the nutritive qualities of the blood itself. The import of the first is the invasion of a formidable local disease, accompanied by congestion; of the latter, the already advanced stage of an affection which has ulcerated large vessels, and, it may be, impaired the coagulability of the vital fluid, and certainly the contractility of the arterial and venous structures. The

Treatment indicated.

treatment indicated by these considerations is manifest. The occurrence of hæmoptysis in the early stage must be met by local depletion, of which the best form is leeching, after which a cupping-glass may be applied; and further, by cooling, saline medicines, the most perfect quiet, abstinence from all mental or physical excitants, and by the use of iced drinks. The hæmoptysis of the later period demands styptics of the stimulant kind, as turpentine, as the system will not tolerate the loss of an additional ounce of blood; on the contrary, support must be given; and while rest is enjoined, a diet of an invigorating kind may be

given with advantage. Many lives have been shortened by the opposite or depleting method carried out with vigour, when the patient was already in the advanced stage of an exhausting malady. The condition to be combated is a hæmorrhage from open vessels permeating a diseased and ill-vitalised portion of a highly vascular organ, the system already reduced, the blood itself vitiated and altered, and the vital contractility of the vessels lowered.

If this state be contrasted with that of a congestive hæmorrhage from an organ irritated by the early invasion of disease, with a system, vascular and nervous, working at nearly full powers, the mode of its occurrence will be more readily appreciated, while its treatment will be conducted on the rational principle of meeting the actual requirements of each case.

Frequent slight hæmorrhages.

The third case of hæmorrhage from the lungs in tubercle is that of frequently repeated slight losses. It is due to causes partly mechanical, partly vital. The vessels are themselves weak and impaired in structure, and the smaller branches frequently give way; the circulating fluid has been impoverished and altered, and the force of the general circulation weakened. The import of this form of hæmoptysis is not important; it is never dangerous, often indicative of some slight and temporary congestion of the diseased portion of the lung, or of simple slow extension of the softening process.

The prognostic import of the two former cases demands attention, and our tables furnish evidence that indications of value may be derived from the period of the disease in which the hæmoptysis occurs, its amount, and the frequency of its recurrence.

Hæmoptysis without tubercle.

Those who rely on this symptom as pathognomonic of phthisis must often, however, be greatly deceived in their diagnosis, and their prognosis may be found not unfrequently in error. Out of 446 cases occurring in

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my hospital practice of non-tuberculous disorders resembling consumption, a very large proportion had hæmoptysis, and in addition to these there were carefully noted 191 instances of spitting of blood without consumption, depending on cardiac disease, bronchitis, &c. In many of these, the blood coughed up had all the characters of phthisical hæmorrhage, being florid, frothy, &c. Even deducting the cases of vicarious origin, and all those in which the symptom was feigned, there remains a large number to contradict many of our diagnostic maxims. The rule must, therefore, be laid down that, without the evidence of physical signs and the concurrence of other symptoms, the diagnosis of tubercle in the lung cannot be made from hæmoptysis alone, no matter what its characters may be. I have witnessed the most profuse pulmonary hæmorrhages repeated again and again without any physical signs in the lung of either tubercle or congestion, without any of the history of consumption, and without cardiac disease.

Phthisis.

In the section on the first stage of phthisis, the value of hæmoptysis as a prognostic has been considered.

Rare in acute phthisis.

The acute phthisis is not commonly accompanied by this symptom and, if present, it is rarely in the profuse form.

Ordinary continuous phthisis is not infrequently characterised by a moderate hæmoptysis at the outset, and by streaks of blood in the expectoration in the later periods of the disease.

Profuse hæmoptysis, its prognostic value.

Profuse hæmoptysis at the commencement of phthisis argues a rapid passage of the disease from the first into the second stage, but the ultimate duration of such cases as a whole does not appear to be as short as that of several other varieties of tubercle.

Not fatal at commencement of phthisis.

Profuse hæmoptysis is not fatal at the commencement of phthisis, nor does a first attack commonly prove so in any stage of the disease. It is most com-

mon in the third stage, then in the second, and most rare in the first stage of phthisis; but a large proportion with this symptom were found within the first three months of the invasion of the disease, which is to be accounted for by the fact that such cases rapidly pass from the first into the stage of softening or cavity. It is probable that in certain instances the residual fibrinous deposit in the lung is capable of becoming the nidus of tubercle, and that, when infiltrated into the pulmonary tissue, it readily enters into the destructive changes which accompany softening. For this reason, among others, an early profuse hæmoptysis indicates rapidity in the progress of disease during its primary stages. The congestion, also, of which it is the indication, evidences a condition of the pulmonary tissue the most unfavourable for toleration of the deposited tubercle, and that most fitted to induce in it destructive changes.

Relative frequency in stages.

Residual deposit.

Indicates rapid passage into 2nd stage.

Profuse hæmoptysis is very apt to be repeated, and due caution is to be observed when it has once occurred. The hæmorrhagic diathesis * is well marked in many individuals and even in whole families.

Apt to be repeated.

The present danger of a large hæmoptysis is to be estimated by the amount of lung already diseased; by the single or double nature of the affection, and by the frequency of its repetition. Such an event is very rarely fatal when the blood proceeds from a single † cavity; the remaining parts of the lung being clear. Double disease is the condition fraught with most danger, as the remaining respiratory space is blocked up, and the patient may die instantly from suffocation.

Danger of, in what cases.

* I have seen fatal hæmorrhage occur from the use of the scarificator around the knee-joint. A patient under my charge nearly bled to death from a slight cut in the head, but he survived to die the following year from profuse hæmoptysis.

† In 21 cases of fatal hæmoptysis occurring in the Hospital, and which were examined after death, all had disease in both lungs. See *2nd Medical Report*, p. 20.

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Fatal case.

A. V., a gentleman's coachman, had been under my care for years, and having all the comforts of life, and very few demands on his strength by his kind employers, he managed to tolerate a large amount of local disease, and looked in very fair health. There was a large cavity in the left apex, with diffused crepitation over the remaining part of that lung. Softening, of a slow character, had commenced in the opposite lung at the apex. He was attacked by profuse hæmoptysis while driving the carriage, and dropped dead off the box. He had had hæmoptysis some years before.

Mode of death.

The patient may also die from the repetition of the hæmoptysis in such quantities and at such short intervals, as to exhaust all vital power. A good many such cases are lost in our wards in spite of the most active treatment. The pulse is the best indication, as until it loses the hæmorrhagic character there is no safety for the patient. When it resumes its natural action, a prognosis of recovery from that attack may be safely offered, provided the patient is not already much exhausted by the hæmorrhage, by diarrhœa, or by the various events of ordinary phthisis.

Pulse.

Weak heart.

A moderate single hæmorrhage will often end the case in patients previously much reduced. The heart, thinned and enfeebled, is unable to continue its contractions, and, supplied by a less stimulating blood deficient in red corpuscules, yields at once when, in addition to these deficiencies, a sudden diminution in quantity occurs.

Moderate hæmoptysis.

Immediate effects salutary.

A moderate hæmoptysis, in the course of ordinary phthisis, is to be considered as an event with present and remote results. The immediate effect is salutary. The cough is relieved, the sense of dyspnœa lessened, expectoration becomes easier, and the patient, who had before been distressed by night cough, can often lie down and sleep. Hectic becomes less and the pulse more moderate, while the daily exacerbation is generally lessened or may even cease altogether. This result may be observed from the time when the sputa

cease to be coloured, which may be about the third or fourth day from the expectoration of fluid blood.

Who can avoid seeing in this evidence of the fact that congestion of the lung, and not the mere presence of tubercle, gives rise to the more grave symptoms of phthisis?

Remote effects lowering.

The more remote effects of a moderate hæmoptysis are undoubtedly lowering, if the disease have been already much advanced, and the system reduced by hectic. If to this state a diarrhœa be added, we have a condition very perilous indeed. Supposing the digestion to be sound, and sanguification active, the loss may be repaired, and recovery up to the former average of strength and flesh be attained. But it is otherwise when the vital powers have been already reduced, and the heart's action weakened, for under such circumstances the circulation never recovers its tone or volume, and the patient is in a permanently lowered condition. The value of the integrity of the digestive system is here strikingly exhibited. If blood-making be not equal to restore blood loss, the balance is against the patient.

Heart does not recover its tone.

A critical examination of the heart and tongue will therefore much assist our prognosis. If the first sound of the heart be very feeble or nearly lost, and the impulse be weak; and if the tongue be much and permanently furred, or stripped red, and morbidly clean, or aphthous, the prognosis must be bad, after even a moderate (℥vi. to ℥vii.) hæmoptysis.

Reaction after hæmorrhage rare in phthisis.

The phenomena of reaction after great losses of blood are very rarely observed in phthisis after profuse hæmoptysis. Thus we seldom witness the bounding pulse, increased colour, giddiness, noise in the head, cardiac distress, amaurosis or delirium, jactitation and restlessness, which are well known in cases of vascular reaction after great hæmorrhages. The system appears to have less resilience and power of resistance,

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and when once reduced it remains at the lower level. The weakness and thinning of the walls of the heart must also have an influence, and prevent reaction to any considerable extent.

Syncope.

Finally, it is not to be forgotten that patients weakened by a great loss of blood occurring in the course of an exhausting disease, are liable to sudden syncope. Death often takes place long after hæmoptysis has ceased, and such an event may be precipitated by any exertion or even by a sudden change of position. The most perfect rest should therefore be enjoined in such cases.

Analysis of 351 cases of profuse hæmoptysis.

The following tables show some of the most interesting particulars in 351 cases of *profuse hæmoptysis*. Of these 50 had this symptom in a very marked degree, and they are separately grouped.

Influence of sex; the profuse form in men.

From these it will appear that males are much more subject to spit blood in large quantities than females.* On the contrary, in the more moderate degree of hæmoptysis females predominate.

In all forms more females.

Taking both sexes and all forms of hæmoptysis together, it has been found that many more females than males had this symptom.

Very profuse hæmoptysis: stage; age; duration of case.

The following table presents an analysis of 50 cases of *very profuse* hæmoptysis in which the quantity ranged from one pint to several quarts:—

4	cases	were in the	1st	stage of	phthisis.
26	„	„	2nd	„	
20	„	„	3rd	„	
6	„	were under	20	years of	age.
28	„	were between	20 and 30	„	
12	„	„	30 and 40	„	
4	„	were over	40	„	
18	had	been ill for	1	year.	
16	„	„	2	years.	
10	„	„	3	„	
2	„	„	4	„	
4	„	„ over	4	„	

* See also p. 16 of *2nd Medical Report* of the Hospital for Consumption.

Analysis of 351 *Cases of Profuse Hæmoptysis occurring in the author's practice.*

Profuse hæmoptysis: 351 cases analysed.

	No. of cases.
Males	267
Females	84
Age under 20	43
„ between 20 and 30	168
„ „ 30 and 40	100
„ over 40	40
In the 1st stage of phthisis	45
„ 2nd „	143
„ 3rd „	163
Had symptoms of phthisis for 1 year	95
„ „ 2 years	102
„ „ 3 „	77
„ „ 4 „	33
„ „ over 4 „	32
„ „ for an indefinite period	12

The youngest patient exhibiting this symptom was eleven years of age, a girl in the second stage of phthisis who had been ill one year, and had the hæmorrhage to the amount of two pints within three months of the commencement of her illness. The largest quantity recorded was eight quarts by a man aged twenty in the second stage of phthisis, occurring within the first three months of illness, and whose case was under observation for three years, during which time the hæmorrhage was frequently renewed.

The duration of these cases of profuse hæmoptysis while under observation, taken as a whole, was found to average 30·35 months, which is a higher range than might have been expected from theory, or rather from the popular estimate of the destructive character of this symptom. It will be seen that many of these patients had been affected with symptoms of phthisis for two years, three years, and four years, and some few for a much longer period.

CHAPTER XX.

GASTRIC SYMPTOMS—DIARRHŒA, FISTULA.

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We are not inclined to adopt the term gastric phthisis as denoting a distinct variety of the disease. In very few instances does any consumptive patient escape without irritation, and even ulceration, of the mucous tract. There are cases, chiefly of the continuous, rapid variety, in which the gastric symptoms form the leading features, and impress, from the very first, a specific character on the disease. But experience has not shown us that in any instance in adults has the evidence of pulmonary tubercle been wanting, although the prominence and urgency of the gastric disorder may have thrown the lung affection into the shade.

Affections of the gastro-intestinal mucous membrane in phthisis exercise a powerful influence on the progress of the disease. As an actual and proximate cause of death, they are probably more fatal than the lung disease itself. The early stages of acute phthisis are in many instances more marked by gastric than by pulmonary symptoms, and certainly the former cause more distress, and depress the vital powers more rapidly and to a greater extent, than the latter. The thirst, anorexia, red tongue, nausea or vomiting, and irritative diarrhœa which accompany the continuously progressive phthisis, are as characteristic of the disease as are hectic, cough, and hæmoptysis.

In the latter stages of all forms of phthisis, the

breaking up period of old deposits, and in the intervals or pauses of the lung affection, this irritation of the mucous surfaces is often found as a most destructive agent, which in its milder forms keeps the patient at an habitually low average of strength, and in its more severe precipitates a fatal issue, which but for this complication might have been long delayed.

Like the other features of phthisis in the more chronic form, it is intermittent, and seldom assumes continuity till ulceration of some portion of the membrane occurs.

In the early attacks it is purely an irritative symptom, but in the later there are invariably lesions of the mucous structure.

All authorities are agreed as to its prevalence in phthisis. Laennec found the stomach sound only in one-fifth of all his dissections of phthisical cases. Louis gives the same figure, and records 'softening' of the gastric membrane in 'one-tenth,' and ulceration of the large and small intestines in 'five-sixths' of the cases examined after death. Our own experience would give even a higher proportion than this.

As an element in prognosis, therefore, all forms of gastro-intestinal irritation are of bad import, their present effect on the patient being exhausting, and their occurrence indicating at least a commencement of one of the most unmanageable complications of phthisis. Whether tubercular disease falls with greater severity on those who have previously suffered from irritation of the gastro-intestinal membrane, is a question on which we have no direct observations to offer; but we are inclined to think that such a condition previously existing leads the way to a more rapid form of phthisis, should the latter disease be acquired.

To the views of Bennett and others that phthisis originates in acidity of the primæ viæ, we cannot wholly give our adhesion, and some observations have

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been given which do not entirely bear out the conclusions alluded to, but of the frequent concurrence of such disorder with some of the acute forms of tubercular disease, there can be no question.

It is well to consider separately the purely gastric and the intestinal symptoms.

Gastric symptoms earliest.

The former, in rapid phthisis, are the earliest to appear. In the most acute form of tuberculosis they may even be the first symptoms of departure from health. Out of 113 cases of rapid phthisis, it was found that 97 presented gastric symptoms, of more or less severity, within the first three months. In the same class of cases diarrhœa appeared in the following periods: viz., within the first three months, 27 cases; within six months, 12 cases; and within nine months, 2 cases.

The gastric symptoms were nausea, vomiting, thirst, red, and often dry tongue, and in certain rarer instances severe gastralgia. The appearance of the tongue is often very characteristic. In the earlier stages furred, it becomes red, preternaturally clean, stripped, smooth, and shining. Aphthæ succeed to this state, as the vital powers decay. These successive changes in the tongue are more commonly seen in cases where the purely gastric symptoms predominate over the intestinal.

Vomiting, two varieties.

The vomiting may occur in two ways. As the result of such irritation of the lining membrane as causes rejection of food soon after it has been taken; or as the result, more mechanical than irritative, of the act of coughing. By a reflex action when food is taken, a fit of cough is induced, and the straining of the diaphragm and of the abdominal muscles, empties the stomach of its contents. The recognition of these two

Treatment.

varieties of vomiting is highly useful in practice. The former is best allayed by sedatives, as morphia; the latter by brandy. Irritation of the pneumogastric

nerve is doubtless much concerned in the production of this symptom.

Vomiting and other gastric symptoms, however common in the more acute and rapid forms of phthisis, are not limited to these varieties, but are present in a large majority of chronic cases towards their termination, and accompany the final stage of consumption. So invariably present are these symptoms, and so characteristic of the final break-up, that if a new division of phthisis could assist either in diagnosis or in treatment, the last stage might well be called the gastric.

Prognostics.

Viewed as prognostics, it may be said that when these symptoms usher in phthisis, they denote a rapid form of the affection; and when they appear in the progress of chronic cases, they are indicative of great danger; when present in intensity and with the aphthous state, death is generally near. A great and often sudden change comes over the patient. A sense of extreme weakness and exhaustion, which he endeavours to describe in the most forcible language, but which is better gathered from his prostrate appearance than from his words, prevents sleep, and engenders an excessive restlessness which no change of posture can relieve; a rapid small pulse betokens sinking of the vital powers; and often there are no intercurrent affections, as pneumonia or diarrhœa; or great losses, as copious hæmoptysis or expectoration, to account for the rapid alteration in the patient, who, only the day before, may have been walking about the ward. The tongue and pulse in these cases are characteristic: red and stripped and aphthous, or rough with elevated papillæ, and spotted all over (like snow-flakes on red flannel), the tongue seems to have lost its vitality. The prognosis of such a state need not be dwelt on.

On the whole, it would appear that continued irritation of the intestinal mucous surface can be longer

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Diarrhœa.

tolerated than a similar state of the gastric membrane. Diarrhœa does not often accompany the earliest stages of any of the varieties of phthisis, and in its first attacks is not the result of ulceration; but its frequent renewals, although each access is productive of much weakness to the patient, are wonderfully tolerated. Even months may elapse before extreme prostration occurs, and the measure of the danger is in many instances rather to be estimated by the concurrence of other symptoms, as severe hectic, than by the frequency of the attacks of bowel disorder.

The *persistence* of diarrhœa is, however, always a grave symptom.

In 3rd stage.

In 39 cases observed with regard to stage, it was found to coexist with cavity in the lung in 22 instances; with softening in 12; and with the stage of deposit in only 5 cases. In the persistent form it is, therefore, chiefly associated with the third stage of phthisis. In some exceptional cases we have seen extensive ulceration of the ileum and cæcum in which diarrhœa had not occurred during life.

When this symptom resists all remedies, but is steadily persistent, its prognostic import is of the worst character. In spite of the non-extension of lung disease, and of the absence of hectic, such patients progressively lose flesh and strength, and die of exhaustion. In these instances, the tongue may not for a long time denote any mischief, but anorexia is an early feature. The diarrhœa may nearly cease a day or two before the fatal event.

Fistula in Ano: Phthisis.

Fistula.

The coincidence of abscess by the side of the rectum with phthisis, has been regarded by most authorities on this subject as conducive to prolongation of the tubercular disease. The observations which we have been able to make with accuracy confirm the opinion. The

tendency of such collections of matter to burrow and form sinuous communication with the bowel and with each other is well known. Whether in phthisis such tendency is greater than where no such disease of the lung exists, belongs rather to the province of surgery than of medicine to decide, but we are inclined to believe that such is the case. It would still further appear that in tubercular cases these sinuses are difficult to heal, and that although operation be had recourse to, a chronic discharge from an imperfectly healed fistula most commonly remains.

It is matter of observation that irritation of a portion of the gastro-intestinal canal is often manifested at the extremities of the mucous tract. Of this, aphthæ coincident in the mouth and fauces and also at the anus, and irritation of the nostrils in children the subject of intestinal worms, are familiar examples. The exciting cause of fistulæ in phthisis may thus be accounted for. These cases of phthisis with fistula are certainly not ordinarily accompanied by diarrhœa, and the discharge from the neighbourhood of the rectum is, therefore, not due to mere extension of irritation from the ileum and cæcum. More probably it is due to the cause alluded to, and is properly a reflection at the extremity of the mucous tract of an irritation existing near its other extremity.

Operation not successful.

The result of such cases as we have witnessed is that the operation is not ordinarily successful in healing the fistula; that if successful for a time the discharge almost invariably returns; that the phthisical symptoms always increase after the healing of the sinus; and that the discharge itself is a condition favourable to the quiescence of the irritation in the lung. In very frequent instances, the aggravation of all the symptoms of phthisis has occurred almost immediately after the suppression of the discharge.

The converse is also true. The long continuance

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of fistula in cases of consumption has been found very constantly where the lung affection is much prolonged, and presents the features so often alluded to as indicating very chronic consumption.

More common in females.

The coincidence of the two affections (tubercle in the lung and fistula in ano) is much more common in males than females.

It is rarely found in early life, and is uncommon under twenty, the age at which it most prevails being from thirty-five to forty-five, and in senile phthisis the combination is by no means rare.

In the larger proportion of cases it is found in the third stage of phthisis, next to this in the second, and in but few instances in the first stage. The phthisis is the earliest affection, but it occasionally happens that the fistula precedes all symptoms of consumption.

When the chest disease precedes the fistula, the latter is rarely found within six months of the access of the lung disease, and most commonly is observed only when the patient is in the second or third year of pulmonary consumption.

Bad results of operation.

When the operation is successful the patient is commonly, as regards the phthisis, in a quiescent state; but generally within one or two months the lung disease assumes activity—the symptoms being dyspnœa, sense of tightness across the chest, hæmoptysis, or in cases already chronic a great increase of cough and expectoration. With these an access of hectic, more or less severe, is very common. Should the discharge return, these symptoms commonly subside.

Symptoms of abscess subacute.

The symptoms of abscess by the side of the rectum in phthisical cases are ordinarily of a subacute character. In many instances the patient cannot state with accuracy when the local affection began, and is only led to investigate the matter on discovering a discharge from the part.

The average duration of these cases of phthisis is

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Duration long.

undoubtedly long. And as an element in prognosis it is a valuable symptom. This will be apparent from the consideration that fistula is never found associated with acute phthisis: that it is extremely rare at the age when that disease exhibits its most rapid forms, and that it is most common in the stage of cavity and associated with a non-febrile state of system. It has been remarked above that fistula is not commonly co-existent with diarrhœa, and it is possible that the latter symptom may be intercepted as it were by the chronic discharge from the terminal portion of the mucous canal.

The following table gives some details of about thirty-one cases of phthisis with fistula. And although the number be small, the leading features of the associated affections are sufficiently marked to make it worthy of insertion here.

Analysis of Cases of Phthisis with Fistula in Ano.

AGE AND SEX.		
Age.	Males.	Females.
20	3	0
25	4	1
30	3	0
35	5	1
40	6	2
45	2	0
50	2	0
55	1	0
60	1	0
	27	4

DURATION WHILE UNDER OBSERVATION.	Nos.
Indefinite, very chronic	8
Had been ill 6 months	1
„ 1 year	3
„ 1½ year	3
„ 2 years	4
„ 3 „	3
„ 4 „	4
„ 5 „	1
	27

The average duration of each case in males was, 29·05 months (omitting the indefinite periods):—

Stage	1	4 cases.
„	2	7 „
„	3	20 „

Of these ten were operated on with the following result:—

Fistula healed and chest symptoms became worse in	3	cases.
Phthisis commenced after the operation in	2	„
The fistula returned in	3	„
Result doubtful	2	„

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In twenty-one cases no operation was performed :—

Fistula persistent, chest symptoms remained chronic in 14 cases.
" " " became worse " 4 "
" had existed long before phthisis, the latter being in a quiescent form " 3 "

CHAPTER XXI.

PNEUMOTHORAX.

THERE are three modes of death after this lesion.

Three modes of death.

1. The shock to the system causing rapid collapse.
2. The supervention of effusion into the pleura, with the accompanying irritative fever and subsequent exhaustion.
3. The new lesion not having proved immediately fatal, the case becomes chronic, and the patient sinks in the ordinary course of the tubercular disease, the termination not being directly due to the pneumothorax.

1. *The shock proves fatal.*

Shock fatal.

This result I have witnessed within twenty-four hours, and within one week after the accident. Whoever has seen the effects shortly after its occurrence, cannot fail to be struck with the general depression of the nervous and circulating systems. The patient is conscious of an alarming alteration. He is pale, gasps for breath, and is intolerably restless. The respiratory efforts are immense, but the relief from the deepest inhalation is trifling. There is a consciousness of diminished space for breath, and many sufferers have exclaimed that the air does not enter. An acute local pain aggravates the distress. Position frequently changed fails to relieve, and if the opposite lung be unsound (as often happens), there is a constant struggle to retain a posture on either side, very painful to wit-

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ness. Orthopnœa supervenes. The pulse is at once greatly reduced in volume, and increased in frequency. The systemic circulation cannot fail to be embarrassed, from two causes.

1. The volume of blood in the pulmonary circulation is diminished by one half (if the collapse of the lung be complete), and the balance between the right and left cavities of the heart is interfered with. As a question of quantity alone, this altered distribution of the circulation must be a trial to the system, and venous engorgement be the immediate result.

2. The diminished aerification of the blood, from deprivation of nearly half of the respiratory space formerly available. The great nervous centres are supplied with impure blood, and all ultimate capillary changes, whether for secretion or for decarbonisation, are imperfectly performed. The respiratory process, which is spread over all the tissues, resulting in molecular, heat-producing changes, the oxydising of effete material, and the removal of carbonaceous impurity, is disordered, and the patient is reduced somewhat to the condition of an animal with communication between the right and left cavities of the heart. The intense nervous exhaustion, dyspnœa, pallor, loss of animal heat, thready and rapid pulse, indicating feeble ventricular contraction, form a group of symptoms which often results in speedy death, and the prognosis required immediately after the occurrence of perforation of the lung, being formed with regard to these altered physiological relations, cannot be other than a grave anticipation of the worst result. Should the shock prove fatal in from twelve to twenty-four hours, there is no pause in the increase and progress of these symptoms; but it not uncommonly happens that a week or more may elapse before the system seems to have realised the injury to its chief vital functions. The fatal result is not, however, less attributable to

the primary effects of the accident, than if death had occurred within a few hours; and I have had occasion to remark that so long as the patient is kept perfectly quiet, and no demands are made on the nervous or circulating powers, life may be continued, although at a low par, and valuable time be gained for the economy to readjust its requirements to the alterations which have taken place in the respiratory system. The following case well exemplifies this.

Case. Limited cavity, pneumothorax, death in 10 days.

T. C. æt. 18, had been for some months under my care, and had a cavity in the apex of the left lung, evidenced by the usual signs. Her general health was very slightly impaired, the fever which had attended the softening and excavation stages having subsided some months previously, and the opposite lung affording no abnormal sounds. She was in pretty good flesh, had a moderate, daily expectoration, and her appetite was excellent. She was able to attend to her business as barmaid in a hotel. One morning, while dressing, and in the act of combing her back hair, she was seized with sudden pain in the left shoulder, with faintness and dyspnœa. On arriving, I detected the occurrence of pneumothorax. The left side was loudly resonant on percussion, vesicular respiration absent, metallic sounds accompanied the inspiration, and amphoric blowing was heard just below the spine of the scapula. Perfect rest and stimulants restored her, and she was comparatively comfortable on the next day, and improved daily for a week. When calling to pay my usual visit on the tenth evening, on passing by the bar of the hotel, I was surprised to see her sitting in a small room inside it, and enclosed by glass partitions in the usual fashion. On entering, I found her eating bread and cheese, and drinking ale, and several persons were smoking, so that the atmosphere was, even to me, intolerable. I at once suggested her removal to her bedroom, and she was carried up in a chair as she had come down. She was in good spirits, but said that she had felt a strong desire to 'have her supper again in the old place.' She was put to bed, and did not seem to be much exhausted, but she was found dead in bed at 2 A.M. that night. No post-mortem was allowed, but there can be no doubt that she died of collapse, just as might

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have occurred within the first day, and that the exertions made had demanded more from the system than its impaired nervous, respiratory, and circulating powers could meet.

Prognosis to include a temporary rally.

In all cases of pneumothorax, therefore, the prognosis is to include the likelihood of death occurring within the first week, even although the other lung be sound, and the general health previously but slightly impaired in proportion to the local mischief which has given rise to the lesion in question. It is not out of place here to recur to the observation previously made —that acute attacks occurring in the course of chronic disease are not tolerated in proportion to the strength and robust condition of the patient, but are frequently seen to be best borne by a system which has been already reduced (of course within certain limits); the respiratory requirements being small, and the necessity for aerification of a large quantity of blood being lessened by previous emaciation. This is especially true of pneumothorax, the most prolonged cases of which lesion I have had occasion to witness in individuals who had been emaciated in the ordinary course of phthisis. The persistent vitality of many of our chronic cases of consumption manifested throughout the various secondary complications is here exhibited occasionally in an extraordinary degree, and that which would kill a more robust is tolerated for months by a weakened, and often almost exhausted patient. The opinion offered to friends immediately after the occurrence of pneumothorax arising from a tubercular perforation of the lung is therefore to include the chance of the case becoming chronic, and the possibility of a rally, even from very unfavourable symptoms.

Effusion into pleura.

2. *The supervention of effusion into the pleura.*

Should the immediate shock not prove fatal, there is

most commonly a pause in the progression of all the symptoms. And unless the contents of a cavity have been emptied by a large opening into the pleura, the pleuritis is slow to develop itself. The medical attendant should be prepared for this state of things, and neither build too much on this temporary lull, nor reckon on the certainty of a great increase in the local mischief within a short period. He is to regard his patient as in the utmost hazard of an acute pleurisy—but to suspend his judgment, as to the result, till effusion takes place.

Is the secondary effusion an inevitable result? We may safely say that it is not. The actual physical condition consists in a collapsed lung, more or less bound down by adhesions, and a pleural cavity partly filled with air. Should the purulent matter from the tubercular cavity not be present in the pleura, there is nothing to forbid a partial recovery from the accident which has taken place. That air can be absorbed from the pleura is proved beyond a doubt by the result of operations for empyema, which, performed in the usual manner, invariably permit its entrance through the trocar.

Case. Empyema, operation, air in pleura, recovery.

A boy under my care in the Hospital for Consumption, who had a copious effusion into the left pleura, was operated on by Mr. Fergusson, and air was permitted to enter freely into the cavity of the pleura. About three pints of serum were drawn off, and he recovered after some weeks, the lung returning nearly to the base of the chest, but being evidently bound down by adhesions which prevented its complete expansion. I do not advocate this mode of operating, as air must be regarded as an extraneous body hindering the desired descent of the lung quite as much as serum. The valvular syphon of Dr. Russell seems preferable to the ordinary trocar.

The physical conditions required to produce an emptying of the contents of the cavity into the pleura are

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to be remembered. They are: a large opening, especially in a part where the exudations previously thrown out to protect the lung from this very lesion, do not form the thick impervious covering which we find so difficult to break down in our autopsies of tubercular cases. The opening in pneumothorax is generally very small, it is also often fistulous or valvular, and with difficulty gives issue to the contents of the cavity. Pulmonary resilience is partially lost, owing to the collapse of the lung, and it is wonderful how little fluid will escape into the pleura unless the rent be large, dependent and direct.

The period at which the effusion due to acute pleurisy supervening may be expected, will vary with the case; but there is commonly a lull in all the symptoms if the immediate shock be survived, and the case has already lasted a week. When it does occur, it is rarely of that passive kind which we occasionally witness in idiopathic pleurisy. The symptoms of pain, dyspnœa, with shivering, hard and rapid pulse, and heat of the surface, are present, and the subsequent exhaustion is more rapid and urgent. Should the opposite lung be affected with tubercle to any considerable extent, the case is very hopeless, and the patient sinks with symptoms of respiratory difficulty of the most painful nature. Even in such an extremity as this, however, nature has occasionally proved capable of a rally, and life has been prolonged for months. Instances are on record where external fistula has given exit to the matter, the patient slowly sinking after months of hectic, until an extreme degree of marasmus has been reached. We have not yet accurate records of many cases of pleuritic effusion which owe their origin to perforation of the lung involving pneumothorax.

Symptoms very acute.

There can be little doubt that perforation is a more common result of phthisis than has at all been supposed;

Perforation more common than supposed.

and without going the entire lengths to which some observers have carried their views,* it must be remembered that the cases which are recognised and diagnosed are few comparatively to those which pass before even competent observers. To explain this, it is to be remembered that both the phenomena and physical signs of perforation often pass away before the case presents, especially at public institutions. The extravasated air may have been absorbed, or has been succeeded by the effusion of fluid; the metallic, amphoric, and tympanitic sounds which have primarily distinguished the lesion have therefore ceased with the physical conditions which gave rise to them, and even to a careful observer there will remain only the signs of effusion with a compressed lung.

To detect the presence of a rent in the apex of a lung so forced upwards and backwards by fluid in the pleura is sometimes possible; but far more commonly the physical signs only indicate, by a peculiar crepitation (which is to be carefully distinguished from the ordinary humid crepitus of softening tubercle), a compressed state of the pulmonary tissue. The pre-existing cavity will in most cases be found collapsed, the perforation permitting its walls to approach so that all signs of excavation cease, and, indeed, are very commonly absent from the moment the perforation has taken place.

In cases of pleurisy with effusion presenting for the first time, in the tubercular habit, where the constitutional symptoms and history of the case point to the existence of a cavity, but where the signs only indicate

* Dr. Scott Alison divides phthisis into four stages, perforation forming the fourth. 'The progression of excavation,' he says, 'naturally tends to the penetration or perforation of the pleura;' and he adds: 'I am satisfied that perforation actually occurs in a very considerable proportion of advanced or old standing cases of phthisis.'—*The Physical Examination of the Chest in Pulmonary Consumption, &c.* By S. Scott Alison, M.D. Lond. 1862. p. 270.

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effusion, it is quite possible that the history may have been that of tubercle, cavity, perforation, pneumothorax, and effusion in consecutive order, of the last of which lesions we can alone find existing physical evidence—the actual signs of air in the pleura communicating with the bronchial tubes having been replaced by those of effusion. The real nature of many of such cases no doubt often escapes detection; and it thus happens that pneumothorax is actually of more frequent occurrence than has been supposed.

Other causes of pleurisy.

When the other causes of pleurisy in the tubercular habit are considered, it will be found that this one (previous pneumothorax) has a right to be classed with them; but more frequent annotations of such cases have yet to furnish us with numerical data of accuracy as regards its relative frequency. These other causes would appear to be—

1. Extension of irritation from the lung outwards.
2. A deposit of tubercle in the pleura itself.

The ordinary pleuritic attacks which occur in the progress of all cases of phthisis are of a subinflammatory nature, and in the vast majority of instances terminate in a slight effusion of lymph, which unites the pulmonary to the costal pleura. They are plainly the natural means of limiting, circumscribing, and walling up the disease in the lung. They are the safeguard against perforation; and if, as stated by Dr. Alison, 'the progress of a cavity be to the surface,' these barriers interpose in a most effectual manner an obstacle to such advances of local mischief. If we can conceive for a moment a lung in an advanced stage of tubercle, riddled by excavations of various size, and lined only by a thin pellucid membrane like the pleura when healthy, we can readily imagine how every minute spot of tubercle on the surface must, in softening, imperil the life of the patient, from the danger of rupturing so

frail a barrier. Louis and others have recorded cases of fatal pneumothorax from the softening of a mass of tubercle the size of a pea before thickening of the pleural covering had taken place. It is rare, however, to find fluid effusion taking place from these attacks, which have for their object only a thickening of tissues. Such cases do occur, but they stand in a very small proportion to the numbers of 'dry' attacks, which every tubercular patient undergoes.

2. A deposit of tubercle in the pleura itself is frequently seen in our autopsies. It is not invariably accompanied by effusion, but is its occasional cause. We certainly find fluid in the pleural sac in a number of cases where no such deposit in the membrane exists. From observation and a careful consideration of the reasoning above given, I am inclined to class these causes of effusion in the following order of frequency :

1. Extension from within outwards—from the lung to the pleura.
2. Pneumothorax.
3. Tubercle in the pleura itself.

Third consequence of pneumothorax, toleration.

3. *The patient, having escaped the dangers of sudden collapse and of secondary effusion, may remain in a somewhat stationary condition for an unlimited period, eventually sinking from the primary tubercular disease.*

State of the cavity in the lung.

The following facts must be remembered in forming a prognosis :—The cavity in the lung is rather improved in condition than deteriorated by the perforation. It is the pleural not the pulmonary mischief, and the shock to the system which prove fatal. A vital part which has remained in an injured state connected with ever-continuous respiratory movements, is nearly removed from the influence of the incessant influx and exit of air. From the time that the pleura is filled with air the cavity becomes flaccid, and its secretion seems in most cases to be considerably lessened; not, as has been supposed, by being

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thrown into the pleura instead of into a bronchial tube, but by being absolutely diminished in quantity, the lung becoming collapsed, compressed, and comparatively at rest. There is little doubt that under certain circumstances the walls of a cavity, under such conditions, may adhere and cicatrise; although any calculations founded on the possibility of such an occurrence must be erroneous from the extreme rarity of the case.*

As regards the cavity in the lung in cases of pneumothorax, therefore, the case is no worse than it was, and is, perhaps, in better circumstances; and, should pleuritis not occur, or in the interval before the period of its occurrence, the tubercular mischief is, to say the least, at a standstill. This consideration may perhaps account for the pause which often occurs in cases of perforation after the first shock has been recovered from.

The rarity of the cases in which the primary results of perforation are tolerated by the patient, renders it necessary to scrutinise each with peculiar care. The following has occurred under my own eye, and every physical phenomenon has been repeatedly verified by most careful examinations.

Case. Cavity, pneumothorax, rally for 18 months.

Miss A. æt. 28 years, is of a phthisical family, her mother having died (under my care) of consumption, and one brother being at present in the second stage of tubercle. It is to be remarked that her mother's case was extremely chronic, having lasted for many years, and her brother exhibits the

* Here, indeed, we have the very condition quoad the cavity in the lung, for cure, and it has been doubted by some whether it would not be well to produce an analogous condition artificially, by puncturing the chest walls and the cavity in the lung. If we could be sure that this operation would not afford an entrance for air into the pleura, there would remain arguments in favour of thus removing an irritated ulcerated portion of the lung from the air current, and causing its partial collapse; and if the tubercular excavation could be proved to be single, and the local mischief not to extend to the lower parts of the lung, we should then have a right to begin to calculate on possibilities of doing good by such an opening; but after satisfying ourselves of the existence of these favourable conditions we should find but a small residue of phthisical cases affording even a remote chance of recovery from such a procedure.

same tendency to prolongation of the disease. In the spring of last year she presented the physical signs extremely well marked of a cavity in the apex of the left lung. The base of the same side was slightly crepitant, and the right apex was rather dull, the expiration prolonged, and the respiratory sound rough. She was much emaciated, and suffered from hectic sweating. The digestion was in pretty fair order; the larynx unaffected. Her expectoration was considerable. In the month of March she was seized with sudden acute pain in the left chest, accompanied by dyspnœa, excessive distress, rapid almost imperceptible pulse, clammy sweats, and exhaustion. I saw her after some hours, and found the physical signs to be those of pneumothorax. There was a *tympanitic sound on percussion over the lower two-thirds of the left chest; vesicular breathing absent over this region, and replaced by a metallic sound on both inspiration and expiration; metallic voice; and amphoric blowing.* The metallic phenomena were most apparent (as is usual) opposite the spine of the scapula. The physical signs of cavity formerly evident (pectoriloquy and cavernous blowing) were replaced by a peculiar crepitant sound, resembling that heard in a lung compressed by fluid. The decubitus was on the back, the patient inclining slightly to the affected side. Under the free use of stimulants, with camphor and opium, she rallied from the immediate shock; the pain ceased; the distress moderated; and after eight weeks she was in a fairly comfortable state, having as yet never left her bedroom, but being able to talk and receive visitors; and decidedly free from pain and marked dyspnœa, unless exertions were made. In this case I noted that the metallic sounds and amphoric blowing *occasionally entirely disappeared*, and were replaced by the dry crepitant lung sound for some inches below the scapula, over which space at the same time the tympanitic percussion note was also absent, and on these days she was better. But the old physical conditions invariably returned after a day or two with increase of dyspnœa. This would appear to arise from the lung being as yet free from adhesions in its lower part, and thus occasionally able to expand and partly occupy its old position. The only obstacle to its entire expansion is the air in the pleural sac. The opening is probably small and valvular, or fistulous. I have verified

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this alternation of the physical condition by careful examination on six or eight occasions.

She went out repeatedly during the winter, was able to walk half a mile, and go to church. She could talk with ease and in a clear voice, and with sustained power of conversation. She was entirely without fever, and remained so for months. She had regained flesh up to a standard far above what she stood at before the perforation occurred. Expectoration for many months was scarcely anything; but from taking cold it again increased. Over the whole left lung there is heard, one year later, *moist crepitation, most intense at the apex;* but the *former signs of cavity have entirely disappeared, viz., cavernous blowing, pectoriloquy, and gurgling. The dulness on percussion remained.* The opposite lung tolerably free.

There can be little doubt that in this case, which has been carefully watched and honestly recorded, the pneumothorax had a curative tendency, and that the patient having escaped the early result of inflammation and effusion into the pleura, had profited by the state of comparative inactivity into which the diseased lung was thrown, and for many months remained actually in a better state than she was before the occurrence of pneumothorax. She survived the occurrence for eighteen months, and died while still under my observation with the ordinary symptoms of slow phthisis.

Perforation of the lung, pneumothorax, and effusion into the pleura from the bursting of a tuberculous cavity, in a child 3½ years of age.

Case. Very small cavity in a child æt. 3½, pneumothorax, death, post-mortem.

B. C. a male child, aged 3½ years, had been staying at a friend's house for a fortnight, and returned home apparently in pretty good health on October 23, 1862. He had however slight cough, and brought up a spot of blood on some phlegm the day after his arrival; but he played and ate as usual. On the 29th he was seen by the late Mr. Sawyer, of Park Street, and was found to be suffering from great dyspnœa and restlessness, with almost imperceptible pulse and suppression of all the secretions; the respiratory

sounds were very feeble over the right side. He was treated by calomel and ipecacuanha and a blister to the right side; on the next day he had rallied, the pulse rose, but the child was evidently in great distress and screaming violently. On the 31st, Mr. Sawyer asked me to see the case; I found the child much exhausted; respirations 64; pulse 140, very thready; great restlessness, and a very collapsed expression of countenance. On examining the chest the existence of pneumothorax on the right side was evident: *anteriorly from the nipple down there were tympanitic percussion note, and very marked metallic sounds both on inspiration and expiration; a very feeble respiratory murmur was heard over the upper part of the lung; the base posteriorly was dull; no respiration heard; puerile respiration in the opposite lung.* Some œdema of the integuments existed on the seventh and eighth ribs at the right side, but no fracture was detected. The diagnosis of perforation of the lung, pneumothorax, and subsequent effusion into the pleura was offered at the time. The cause of the perforation of the lung remained to be seen. There was no evidence of injury having been received; while, on the other hand, the tolerably good state of health of the child, and the absence of predisposition to tubercle in the family (for which careful enquiry was made), rendered it unlikely to have resulted from the bursting of a tuberculous cavity. The child died the same evening (31st).

On November 2, the post-mortem examination was made by Mr. Sawyer and myself. The body appeared to be fairly nourished. On opening the right pleura air escaped through the incision; the lung, collapsed, lay in the upper and back part of the pleural cavity. Both the costal and pulmonary pleuræ were rough and lined with fresh lymph, and flakes of lymph floated about in a thin turbid fluid of which there were twelve ounces in the pleura; a single band of adhesion connected the base of the right lung to the diaphragm; another band stretched across to the seventh rib. There was no fracture of the ribs. The lung was removed and a blow-pipe tied into the bronchus. On immersing the lung in water and blowing through the tube, air issued freely from a point in the interlobular fissure, and from another in the posterior edge of the lung. The lung itself was collapsed,

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sunk in water, and was coated all over with a thick layer of lymph. A probe passed easily from the ruptured part into a small cavity in the middle lobe. It is of irregular shape, and about half an inch across its widest measurement. The opposite lung and pleuræ healthy. From these appearances it was evident that a small unsuspected cavity had been formed in the lung very near the interlobular fissure, and that it had ruptured the pleura and given rise to the usual phenomena of pneumothorax, followed by liquid effusion, and terminating in death.

Authorities.

In reviewing well-known authorities on this affection, I find that Laennec says, 'the effusion of air cannot exist for any length of time without giving rise to severe symptoms, and even death. I have never seen pneumothorax in any person who was not confined to bed.' In upwards of 20 cases by Dr. Townsend, 'none lasted more than 5 months.' In 7 cases by Louis, 36 days was the longest period of survival. Dr. Stokes gives, as an exception, one case only which survived 1 year: the rest perished within a few weeks, excepting one, which survived 5 months. My colleague, Dr. Alison, gives 8 cases, of which 6 died within 6 weeks, 1 at 2 months, and 1 lived 18 months. An analysis of 20 cases which occurred at the hospital presents the following results:—

Hospital cases.

12 males; 8 females.

14 under 25 years; 45 greatest age.

9 under 1 year duration (previous).

12 under 18 months' duration; 2 unknown duration; 6 very chronic; double cavities in 18 cases; single in 2.

Duration of life after accident: All but one died under 1 month; the one (4 months) had enormous but gradual effusion into the pleura; 15 died under a fortnight, in from 15 minutes, 1 hour, 8 hours, 48 hours, 3 days, &c.

13 cases occurred on right, 7 on left; in 8 the perforation was at or above the level of the second rib; in

one were 2 perforations; in another, several; the seat of rupture not found in the remaining 9.

Effusion occurred in 12 cases; none in 8.

Death ensued from sudden collapse, or from more gradual sinking, and asphyxia in all cases.

Prognostics.

The prognostics in pneumothorax must almost always be unfavourable. The possibility of such a recovery as we have described must not, however, be forgotten, as those who meet with phthiscal cases in large numbers are now aware of the fact that occasionally a rally may be made for an indefinite period.

The conditions of temporary recovery from the lesion of the lung and pleura implied in pneumothorax are various, and must all be realised.

1. A tolerably well-defined cavity.
2. A well-thickened and protective pleura.
3. A small and fistulous opening into the pleura, large enough to admit the passage of air, and small enough to forbid the passage of liquid matters. Its position in the lung must also favour this condition.
4. The persistent absence of effusion.
5. A tolerably sound condition of the opposite lung.

CHAPTER XXII.

HEREDITARY INFLUENCE.

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THE influences which tend to precipitate an attack of tubercle in the lung in any individual are remote and proximate.

Causes remote and proximate.

Hereditary taints.

The remote causes are found in the hereditary predisposition to tuberculosis, which, although not present in the parents, may have an ancestral origin generations back.

Occupations.

In the occupations of life which prepare the field for the seeds of disease to be sown by other influences, but which are not of themselves direct producers of tubercle.

Privations.

In the privations of life, which are in most instances necessitated, but in some voluntarily assumed, as in the conventual system.

Errors.

In the errors of life—those sins against natural laws, some of which we are all committing, with impunity or to destruction. To this class belong all excesses which waste vital powers, undue carefulness and anxiety, over-watching, sexual excesses, the excited race after wealth or distinction, and the ineffectual struggle against poverty. The over-nursed in close and luxurious chambers, and the student outstepping his powers on a short Alpine holiday; the sorely-taxed governess, toiling all day and sitting up half the night to enjoy the luxury of solitude, and converse with books and absent friends; the under-dressed lady undergoing in ill-ventilated rooms the dangerous excitement of the ball: all these and many others are labouring thoughtlessly to prepare

the field in which the seeds of death may be sown, and become productive or not as other agencies shall determine.

Hereditary predisposition; most influential.

Of all of these, doubtless the most important is hereditary predisposition; for, in its absence, how many struggle through influences and errors which destroy others in early life, and attain a considerable longevity?

Something more than remote causes necessary.

Not all the predisposing causes united could, in a given instance, induce consumption with certainty, without some subtle agent to precipitate, concentrate, and shape those elements of disease into tubercle. 'What can be more obvious,' says Louis, 'than that the first step towards the real and not the fancied knowledge of the remote causes of phthisis must be to ascertain whether the same causes would not entail the development of any other equally chronic disease?'

Analogies. Plants.

We can take the plant in full health, place it in darkness and cold, and with certainty prevent the development of its growth, and its fructification.

Struma.

It has even been stated that external struma may with much certainty be induced by placing under-clothed children in low and damp situations, by restricting their food to the lower farinaceous materials, and by depriving them of milk.

Malaria.

In certain malarious districts at seasons of the year when the marsh poison is most concentrated, exposure under ascertained circumstances is almost certain to be followed by some form of intermittent. Thus we have known four young and healthy men cross the Pontine marshes in September, and sleep in their carriage with windows open. Of these, three had pernicious fever, of whom two died.

Contagious epidemics.

In all epidemics of contagious diseases, as rubeola and variola, exposure is not certain to induce the affection in those unprotected by a previous attack or by vaccination.

There exists on the one hand a degree of certainty that some will undergo an attack if exposed, which far sur-

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passes any likelihood that phthisis shall be induced by an intense combination of the influences which are supposed to lead to it; and on the other even in these eminently contagious and epidemic affections there is recognisable a certain immunity of individuals which points strongly to the fact that something more than exposure and intensity of the diseased element is wanting to complete the vital phenomena of imparted disease.

We know also that where children so escape the contagious influence, the same individuals may at some future time, when they are apparently more susceptible (as we call it), undergo an attack of the disease from a similar exposure.

Certain individuals not susceptible.

We also know that there are some constitutions apparently insusceptible of certain poisons at any time, as in the instances of vaccination repeatedly unsuccessful in certain individuals, however often it may be tried, or however varied may be the source from which we obtain the lymph. Those familiar in hospital practice with the phenomena of typhus are also aware how some escape the contagious influence wholly, whilst others have a

Fever.

repetition of fevers. Among the students in the fever wards the slightest exposure will in certain instances ensure an attack, whilst others even more diligent in their clinical attention to the sick escape altogether. There is even in families a certain proclivity to fever of which we have known remarkable examples, whilst other families escape from even the closest exposure to

Failures in seed crops.

concentrated contagion. So again on some sunny slope well drained and well exposed to wind and rain, equally well cultivated, manured, and sown with the same seed on the same day by the same machine, we shall find, not uniformity of produce, but almost invariably (in the case of turnips) a spot where the crop is dwarfed, insufficient, or altogether absent, which the farmer cannot account for, and where on former years, he has, out of the same materials of labour and seed, found an abun-

dant result, nay more, where next year, or two or more years later, under identical circumstances, he may produce an excellent crop. From considering these facts it will be evident that something more than a prepared soil and healthy seed; something more than an intense contagion and direct exposure to its influence; something more than actual inoculation of morbid matter into healthy blood, is necessary to induce the well-grown crop, or the specific fever, or the peculiar disease which should in ordinary course follow the processes which we have described.*

Susceptibility, what?

This additional something may be called 'susceptibility;' but this is an expression of the fact, and not an explanation of the result, be it failure or success. We want to know why some individuals, some families, some fields, are 'susceptible,' and not others. What is the residual element which is wanting in the non-susceptible, although greatly exposed, and present in the susceptible, when even slightly exposed? Why do not the same remote causes produce other diseases equally chronic, as phthisis? or are there diseases as common dependent on the same causes?

It is evident that the remote causes are not 'per se' sufficient for the production of tubercular disease, and our questions cannot be intelligibly or satisfactorily answered by referring the influence desired to be de-

* M. Trousseau, when commenting on the spread of puerperal fever, says:—'These germs will not be developed as readily in all patients, because the conditions of their reception vary infinitely. Some patients, like certain earths, may not receive certain germs. The wind may spread the same seed widely over a country, and yet the grain will not spring up everywhere alike. Here, the soil may be too wet; there, too dry: here, other germs have grown up, and stifled the new seed. Just so it is with morbid germs and ferments. They individually require conditions favourable to their development.' This argument is pursued, and the necessity of a 'productive soil' insisted on, by Mr. Spencer Wells, in his interesting communication, *Some Causes of Excessive Mortality after Surgical Operations*, read before the British Medical Association in August, 1864.

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fined to the other class of causes which have been called the 'proximate.'

Hereditary taint probably the precipitating agent.

In the absence of more accurate knowledge than science yet possesses, we are inclined to refer the actual precipitation of the disease which we call tubercle to the influence of hereditary predisposition acting in conjunction with, or occasionally even in the absence of, all or any of the other remote agents which give rise to phthisis.

It is true that privation, excess, errors in habits of life, the sedentary occupations, the pernicious influence of certain trades, grief, anxiety, and the other wasters of vital powers, will not suffice to induce consumption in all, or even in the greater proportion of, individuals; for these agents so universally prevalent are part of the daily lot, or of the daily errors, of many more than fall victims to consumption. But it is also true that, if to any or all of these conditions that of inherited tendency to phthisis be superadded, very few indeed escape the disease. And if to these circumstances we add age, the great modifier of this class of affections, we can almost surely predicate, even of individuals, how and when they shall begin to exhibit symptoms of the malady.

Proportion so influenced.

It will be, and ought to be, asked, for what proportion of the cases of consumption this process of reasoning will account? and we answer for two out of three: for such is the proportion of hereditary disease which may be gathered from the observations of the most informed and trustworthy observers.

And how to account for the remaining third of consumption cases: those which have been called accidental?

Accidental phthisis.

The cases of accidental phthisis stand alone to represent the non-hereditary form of the disease, and, as has been elsewhere shown, possess characters peculiar to themselves. They illustrate the fact of the possibility

of tuberculosis arising out of external agencies, and, representing so small a proportion of the whole, may fairly be said to be exceptional; and when from these are deducted the instances which are fairly referable in their origin to acute affections, as fever and the exanthemata, and when the rheumatic diathesis is also eliminated as a cause, we shall find that they are numerically very few. Indeed, before allowing that the hereditary cases are only two-thirds, we shall do well to consider what is the real meaning of the term, when we shall be inclined to extend its influence much further than it at present stands in our calculations.

Great extent of hereditary influence.

Hereditary predisposition is commonly taken to mean the occurrence of the same disease in parents. And it is true that such inheritance is sufficient to stamp the case as belonging to this class. But this is only the terminal link of a chain; and of the higher and preceding links we are generally only informed to the second degree, while to ascertain even this is considered unusual accuracy of research.

Transmission not limited to parents.

Yet no fact is more certainly known than that features, form, frame, peculiarity of constitution, susceptibility to certain agents, not to speak of character mental and moral, the passions, and the intellect, are often derived from progenitors many steps upwards in the ancestral tree. Mr. Sedgwick gives many instances of this in his work and papers on hereditary transmission, and the daily experience of all of us corroborates its truth.

Moral and intellectual traits of remote ancestral origin.

Individually, we are combinations of many ancestors. The actual traits of our parents may or may not be seen in their offspring; and it is more common to find that one or two only are found in each child, and that in a whole family the members represent, each individually, only some single feature of mind or body of one or other parent. Whence, then, are derived the remain-

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ing? Doubtless from some ancestor long forgotten, whose intellectual powers or defects, infirmities or vigour of body, whose faults and follies, whose brilliant powers or miserable failings, may be reflected in a remote descendant, as he had himself derived them from some distant ancestor.

This question of transmission, then, is a larger one than we had supposed. We are accustomed to say that 'gout may skip a generation!' Why may not it skip four or five? Those intimate vital processes on which organization depends are of far more remote origin than is commonly supposed, and reflect the tendencies of untold numbers who have preceded us in the family tree.

The children of a drunkard or of a very old man are notoriously short-lived, and fall victims to organic disease (chiefly tubercular). But should they marry, their children alike possess the taint, only it is modified by the new blood of the second parent, whose peculiarities become engrafted in the offspring.

This new influence may be more or less powerful as the child resembles one or other parent, but the dregs of the taint on the father's side may still remain; and, although the individual may himself escape, owing to the stronger admixture of the maternal element, he may in turn beget children who shall reflect the grandfather's peculiarities, and be the representatives of his weakness and decay. And the process may go on for generations, until sufficiently diluted by intermarriages. After a long interval, however, a lineal descendent may be born who shall represent, out of due proportion, the physical infirmities which his immediate predecessors had escaped, but which he personally derives from the feeble frame or exhausted powers of the forgotten founder of the family. Should his disease be tubercular, the case would be called 'accidental' if induced by the personal errors of the individual affected, but

ancestral predisposition would have determined the diathesis.

Analogy with moral properties.

It is rather a fearful matter thus to look back on the sins of our forefathers, and to recognise the transmitted punishment; but it is not out of accordance with other facts of moral origin, and of highest dictation. The mystery of original sin, the punishment to 'the third and fourth generation,' are paralleled and vindicated by the observations of the physiologist. 'Nor can the fact be disputed,' says Guizot, 'though appreciable with difficulty, that the natural and special dispositions of the individual descend to him in a certain measure from his origin, and that parents transmit to their children such or such moral propensities, just as they do such or such physical temperament, or such or such features. Hereditary transmission enters into the moral as well as into the physical order of the world.' *

Guizot.

Organic life especially influenced by transmission.

In considering the subject of hereditary transmission, it has not escaped observation, that the peculiarities of organic life are transmitted quite as much, or even more, than likeness of features, build, &c., and this is quite in accordance with *à priori* reasoning. Diseases of constitutional origin thus find a ready method of propagation and development. The ultimate processes of sanguification, of vitalisation of alimentary matters, and the formation and nutrition of tissues, are thus directly affected, and here are located the primary errors which become developed into organic disease. Individuals thus placed, as it were, on the chain of inherited disease, may personally escape its influence by avoiding the other agents which concentrate and precipitate any special disorder. They are not, however, the less transmittors of peculiar constitutions, if they are not individually sufferers. The electric current on

* *Meditations on the Essence of Christianity*, &c. By M. Guizot, p. 50. London: 1864.

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the wire passes on its errand, and leaves no trace of its transit.

It would appear, however, that when by the access of external influences they fall victims to the inherited disease, they become intensifiers as well as propagators, and that their children become more liable to the disease in an aggravated form than were the parents.

Forms of disease especially transmitted.

Finally, the forms of disease, those modifications on which depend its rapidity, development, and duration, are most distinctly reflected in families. How often do we witness child after child carried off at the same age, by the same variety of tubercular disease, and with almost identical symptoms. In some families this destructive agent attacks the mesenteric glands in earliest infancy; in others, the brain in early boyhood; in a third, the bones at the age of puberty; in a fourth, the lungs in manhood; or in a fifth, when age is declining, the long-suspended blow is witnessed in senile phthisis, while each family comes to recognise a dreaded period of danger, when its successive members drop off, and an age which, when reached, is fraught with almost unavoidable peril!

Accidental may be added to ancestral causes of phthisis.

But hereditary tendency to disease may be intensified in two ways. First, by the personal errors of any individual on the chain, who by inducing an attack of the constitutional affection which might have continued latent, becomes, as it were, a new focus of disease to his progeny. Like the ganglion on the nerve, this concentration is attended with increased activity. Thus may an 'accidental,' superadded to a 'transmitted' cause, intensify the product to his successors.

Convergence of ancestral liability.

Secondly, a convergence of ancestral liability to disease may be obtained by the intermarriage of persons hereditarily predisposed. No method is so sure as this to ensure a precipitation of tuberculosis. The children of such unions rarely escape.

Marriages of near consanguinity have been supposed

Marriages of consanguinity, why to be avoided.

to lead to the same result, whether there exist any hereditary taint or not, and the question has been of late much discussed. This is not the place to enter on its consideration, but we are inclined to believe that phthisis is not directly produced in this manner. But we hold the opinion that such intermarriages do not, as a rule, produce as vigorous an offspring as those of non-relations, and that such degeneracy of vital power as is due to this cause may in its turn become a predisposing though not a direct agent in the production of consumption.

Remembering, also, that peculiarities of organic life are especially those which seem most capable of transmission; that such are closely connected with the seat of constitutional diseases, and that any weakness is sure to be increased by such intermarriages, we can easily recognise an element of weakness, which, although not itself morbid, may readily be developed into disease. Should both parents inherit a weakness of the vital organism from a common ancestor, the ordinary risks of life are almost sure to seize upon the vulnerable point of the system.

The converse condition is true also. Intermarriages of individuals remote from each other in ancestry, in social condition, in constitution, and in what is called 'temperament,' but above all, the unions of persons of different race and country (if direct taint of disease be absent on both sides), are very generally free from resulting affections of constitutional origin in their children. It is perhaps true that marriages between individuals of different races are not very prolific; and if this be the case, it is another reason for the greater vigour of their offspring, for the members of large families are generally not so individually strong as those of small ones.

This question of large families is also of interest. Parents weakly from any inherited or personal disease,

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are frequently very prolific, and become the propagators of constitutional and organic disorders. We have known as many as seventeen brothers and sisters die of consumption. As a matter of experience, there is no doubt that the phthisical are prolific, and endless instances occur in practice of a mother conceiving when in an advanced stage of tubercular disease, and having a child which survives only a few months. Nor is the generative power confined to the mother. Men in much advanced phthisis often marry and have children.

The phthisical prolific.

Sexual transmission of disease.

The question of the sexual transmission of disease is one of much interest, and we have long adopted the belief founded on observation, that the father transmits to sons, and the mothers to daughters, their respective peculiarities of organisation in greater intensity and with more frequency than the converse. It frequently occurs to us to observe, that daughters personally resembling a consumptive mother, as in colour of hair, eyes, and in general build, become the victims of the same disease, whilst the sons resembling the father who is not the subject of phthisis, escape. It is doubtless occasionally true that fathers will transmit their personal peculiarities of organisation to daughters rather than to sons. But such instances would appear to be rather the exception than the rule.

Indications for prevention of phthisis.

There can be no question as to the practical bearing of these considerations on the hereditary transmission of phthisis. If this great scourge of our race is to be materially lessened, we must go to the source whence it flows. No institution for the special treatment of individual cases, no success achieved in prolonging the duration of such cases, can check the march and progress of a malady at once universally prevalent and destructive, so long as a constantly reproducing agent is at work originating fresh cases, and imprinting at their very conception the elements of certain destruction on thousands of children. It is as

if we were to expect purity of the Thames by intercepting the drainage of London, while we permit the direct access of the sweepings of numerous towns and villages to its streams higher up.

In the prevention of phthisis, this becomes a primary element. So long as the consumptive marry and transmit a tendency to the same disease, which is not escaped by more than one out of every three of their descendants, so long shall we have the same malady confronting us in successive generations. It is not to be expected, however, that the warnings of medical men will have much effect in checking this source of disease, for marriages are entered on without any regard for such considerations. But it is not less our duty to act as faithful watchmen, and warn of the fatal consequences of such imprudence. To the phthisical father, there is an almost certainty of his having unhealthy, short-lived children; and to the phthisical mother there is a double danger, first, that her own health may break up at or after the time of her confinement; and next, that her offspring shall be short-lived.

Marriages of near consanguinity should be strictly forbidden if there be a phthisical taint in the family, as the disease is almost certain to be precipitated on the children.

Marriages of near consanguinity

Marriages of consanguinity also, even when there is no consumptive tendency, should not be lightly entered on. Whether or not it be conceded that such unions generally produce puny and unhealthy offspring, it is certain that organic peculiarities are thereby concentrated, and organic weakness engendered, and the door is thus opened to some of the most fatal maladies to which the frame is incident.

Medical men have this duty to perform, and however unpalatable the advice to be offered, they should not shrink from plainly declaring their knowledge, for it is no mere question of opinion on the points we

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Marriage of the phthisical.

have named. The phthisical should not marry; those strongly predisposed by family inheritance of disease should not marry; near relations so predisposed should not marry; and unions of individuals of near consanguinity, even although personally healthy, should be urged to consider well the possible consequences of such a step. That properties should be consolidated and family interests preserved, is but a poor compensation for the dreadful results of early death, and such grief as no money considerations can lessen, but which they are more likely to embitter when the fatal event has occurred.

Marriage as a supposed remedy.

And here it may be fitting to say a word on the fallacy so prevalent amongst all classes of society, that marriage tends to ward off, and even to cure, consumption in young females. This erroneous opinion has obviously arisen from the fact that in phthisis the catamenial function is often suspended, and it is supposed that if uterine regularity be restored, the impending disease may be averted. But here is a gross mistake. Amenorrhœa is not a cause, but a consequence of consumption. It arises out of the same error of nutrition and lowering of vital power, and deficient sanguification, which have given rise to the tubercular disease. Stoppage of the menstrual secretion is a symptom of constitutional disorder, excepting in the few instances in which it arises from hyper-congestion of the uterus and general plethora, or from mechanical occlusion. Its restoration, indeed, evidences an improved nutrition of the whole body, and increased vital powers, but can have no influence in arresting established, or preventing threatened deposit of tubercle in the lung. We doubt if a single case of true consumption was ever cured or warded off by restoring the uterine function. We equally doubt if any such case was ever caused by its suspension. What can be more cruel than to propose marriage, with its probable consequences, as a

cure or mode of prevention? The feeble girl is to be made a mother, in order that her child may die, and that a fearful time of danger for herself may be incurred at or soon after its birth! or even under the most hopeful circumstances, that the child may grow up to a feeble youth and immature womanhood, and find herself without the care of a mother when early decay is manifesting itself! While such advice as leads to early marriage of the phthisical girl can only come through or directly from medical sources, we are ourselves alone to blame if we permit or countenance such a violation of good sense and of physiological laws. Let any one inclined to act on these views turn to the instances which are presented in the chapter on pregnancy, or examine the cases of married women in our wards, and he cannot fail to perceive in these inexorable facts sufficient evidence to contradict any theory formed on such fallacious grounds.

CHAPTER XXIII.

PREVENTIVE TREATMENT OF PHTHISIS—INFANCY—CHILDHOOD.

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Management of children hereditarily predisposed to phthisis.

Food.

THE management of children hereditarily predisposed to phthisis must naturally engage our attention in considering the modes of preventing consumption. Infants should be provided with a wet-nurse if the mother be delicate, and a thoroughly healthy woman, free from all taint, should be selected for this office. Lactation is to the mother a certain source of ill health, and is a ready mode of developing the tubercular disease, while the child is sure to be imperfectly nourished, and draws with the supply from its mother's breast an additional element of danger to that which it derives from its parentage. It should be kept to this kind of nourishment for a long time, and a too early addition of farinaceous and animal matters to its diet is to be avoided. The most robust children are brought up on milk alone, and the admixture of other matters before dentition has commenced is fraught with danger. We have even seen children judiciously brought up by hand under these circumstances, if the food be not mixed, and the supply derived from one healthy cow. Dentition is generally late, and the appearance of teeth is the signal for an advance in the kind of food, and should be waited for. Everything which irritates the delicate mucous membrane, and causes diarrhœa, should be avoided, and the more active drugs, such as calomel,

should never be administered to these children. On the appearance of thrush, which is very common, the mildest antacids, as fluid magnesia, should alone be given. Should bronchitis occur, depressing agents, as tartar emetic, should be carefully avoided. On the occurrence of measles, the simplest management should be adopted; no medicine is necessary in an ordinary attack, but an even and moderate temperature and diluent drinks will be found sufficient. If pneumonia supervene, these children are not to be subjected to lowering treatment. Pneumonia will resolve itself, and even the double affection will not always prove fatal, if vital power be not too much depressed. Early exposure to fresh air soon after birth is highly necessary, or the infant will be peculiarly liable to attacks of bronchitis. When the weather permits, the pure air of the parks or the country will be found the best of tonics. Sometimes, even with the most judicious diet, infants will be found pale and anæmic, with feeble pulse and circulation, and the best results attend the use of the vinum ferri, in doses of ten drops three times a day. We have administered this as early as the fourth month for many weeks continuously, with most satisfactory effects, the child acquiring colour and firmness of flesh. We have tried many experiments to ascertain how early it is advisable to give cod-liver oil, and have found it unsuitable before the ninth month, and in some cases till after the child has attained one year. It is possible to digest cream earlier, and it may often be given with good effect.

Injurious effects of drugs.

Air.

Iron.

Oil.

Daily bathing of the surface is a valuable habit. At first the bath is to be tepid, but very soon may be used cold. The best method is simple and rapid immersion, which is better than the slower process of sponging; the object being to obtain quick reaction. The clothing of such children should be from birth warm and sufficient. More harm is done from insufficiency than from thin

Bath.

Clothing.

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material. The whole body should be covered with woollen, and the upper part of the chest should on no account be left uncovered; neither, as the child grows older, should any evening stripping be permitted. This covering, once assumed, should not be left off. In the summer of this climate a somewhat lighter material may be adopted next the skin; but such changes as are necessary in very hot weather should be of the outer, and not affect the under clothing, which it is best to maintain of the same warmth summer and winter. Open-air exercise is to be sedulously cultivated. There is no possibility of safety without it. No plea for education, no false theories about taking of cold, are to be allowed to stand in the way of it. Sedentary occupations in childhood and close rooms sow the seeds of death, when predisposition to phthisis exists. Even on a damp day, or in frost, the child had better be out running and using out-of-door toys, unless a very cold wind prevail at the same time. Neither should sun be avoided. Light is an essential agent in healthy blood changes, and plays a powerful part in animal chemistry, although we may not be able to define its action. A freckled child is rarely consumptive—a singular fact, but one which we have verified in very many instances. There is not only mental invigoration in sunlight, but there are doubtless vital agents assisted, and possibly developed by it. The child's day-room should also be exposed to light, having a full southern or south-western aspect; and while there should not be a suspicion of uncleanliness, the air should have full access to it by a window open at top during some portion of every winter day, and almost always in summer, while it should be open every night in the year.

Open-air exercise.

Light.

Ventilation of sleeping rooms.

The ventilation of sleeping-rooms demands even more care. In winter there may be a fire, and a louvre ventilator two feet square in the door, with access

of fresh air from an open window on the adjoining staircase. This should be open day and night, but less open in severe cold weather in winter. The above plan is far better than warming the whole house by a heating apparatus, for it insures change of the respired air, which the latter plan does not. This method of obtaining fresh air in the sleeping floors of our modern houses by an open window summer and winter, has several advantages. The air so entering is derived from the upper stratum and not from that on a level with the streets. It also prevents the access of miasmata, and of the fermentation and products of foul drainage, which are derived from the basement. Where the kitchens are below the level of the ground, (as in London,) a door should shut off the whole of that floor, and with it all entrance of air from drains If a house be shut up at all points at night, the air which must enter will find its way from the drains, and down the chimneys, in both cases foul and impure. Let us then get rid of prejudice and let in that portion of the atmosphere which is the purest that is possible to obtain, and this can alone be had from a free opening on the higher floors of the house, and best of all from a window. Temperature in the bed-room is to be maintained by fire in an open fire-place, which is in itself the best of ventilators. Having thus provided for warmth and pure air in the sleeping-room in winter, we can secure it equally in summer, by leaving the bedroom window open at the top. Delicate children cannot be too soon accustomed to sleep in fresh air. With warm bed clothing, (a very important matter,) this is not only safe, but necessary, and remembering that the organs of respiration are those threatened by the disease we are considering, their vital processes cannot too early be accustomed to pure unvitiated air, and this should not be scanty or filtered though warming machinery, but unrestricted in quantity, and as pure as is obtainable.

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The points to remember about open windows in sleeping-rooms, are that the bed-clothing be sufficient, and that no current of air be directed on the body.

Education.

As the child grows up his education should be physical rather than intellectual, calculated rather to stimulate the growth of healthy tissue, than the often premature development of a weakly brain. The accomplishments of early life are forced beauties which fade while still in their period of promise, unless supported and strengthened into maturity by a healthy organisation. The precocity which delights the thoughtless because of its present beauty, cannot but pain the informed who see in it only evidence of early decay. The brain is, indeed, one of the first organs to fall before the invasion of tubercle, and long before lungs are even threatened becomes the seat of disease. Cerebral tubercle and cerebral meningitis are rare in the phthisis of adults, but common enough before puberty. The other parts of the body most prone to become attacked by tubercle at this period are also not to be forgotten, bone and glands. These and the brain have to stand the first shock, as it were, of those fatal errors of nutrition which often only attack the lungs when puberty approaches.

Puberty.

At this important period of development, if glands and bone and brain have still remained sound, the first great afflux of danger to the lungs arrives—although many sink before this time of pulmonary disease.

If the natural expansion of the frame, and especially of the bony walls of the chest, does not take place, the respiratory function is cramped, and even by the eye we can foretell the threatened invasion of tubercle; whilst in the female, unless the generative functions attain the healthy degree of development, and the nutrition of the body be largely increased, should the child remain a child instead of passing into the further

stage of womanhood, a great retardation of nutrition and vitality is evidenced, and an attack of tubercle is threatened.

The habits of both sexes at this period should be carefully directed to the invigoration of the body by such care as we have described. In addition to warm clothing, and much exposure to fresh air, early hours should be inculcated. No time should be cut off from sleeping hours, either for study or amusement.

Horse exercise.

It is at this period that horse exercise is most valuable, and it should be practised daily in almost all weathers, unless there be much rain or east winds. Should the means of the family permit, travelling will now be found a most invigorating agent. By selecting those climates which permit of it in winter, horse exercise may be almost daily practised in many parts of Italy, as Rome, Florence, Naples; in France, as at Mentone, Pau, and Arcachon, Bagnères de Bigorre, &c.; and it should be understood that this is the use that should be made of a winter residence abroad, and that these precious years should not be devoted to the school-room.

It is by no means advocated that education should stop, but it is of infinite importance that no pressure should be put on the brain powers, and that nothing like exhaustion or even lassitude should be induced by study. These young brains are in many instances unduly active, and even where constitutionally slow, as is sometimes the case, the lost time will be easily made up when bodily growth has been completed. A fair amount of study is ever advisable, health of mind and body being promoted by such moderate exercise of brain power as shall intensify its nutrition, but stop short of over excitement. To allow the body and the body's wants to engage the whole attention, and to monopolise all care, would be to extinguish that vital element of soul which rules, elevates, and subordinates

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the earthly, and often forms one of our most powerful agents in opposing the inroads of disease.

But the judicious managers of youth will avoid either extreme, and single out those of their children whose health would be improved by a certain amount of study from others whose feeble organisation could not admit of it. The rule, however, holds that those who inherit phthisis should not engage at all in the high-pressure work of education which is common in both sexes at the present day.

Competitive examinations.

The boy should not be entered for the race of life as now done: placed at a school where, by extreme diligence and cramming, he may gain a place in a higher school, where all his best powers, assisted by the ablest masters, are to be called out to meet a competition for entrance into some of our government offices, at home, in India, or in our army. The competitive system, while it is honourable to us as a principle, has notoriously failed to give us the very best officers or civil servants for India. For the active occupations of life vigorous health is a requirement quite as important as solid information. In the later struggle of life we know that it rises to be the primary element of success; for how many feeble ones have been swept away to make room for the present occupants of our first positions at the Bar, in political life, in administrative appointments, and in medicine? The *mens sana in corpore sano* is the formula for success. Vigorous bodies and sound lungs are much needed for the Artillery and Engineers, and especially for the India Civil Service. In the latter position the requirements are good health, great activity, and power to resist the over-sedentary occupations of office and magisterial work; and the government officials have begun to complain of the clever, over-crammed, and feeble lads whom we send out to them. This can scarcely be wondered at, when we know that ten and fourteen hours a day for

many months is the average time devoted to study by these youths before offering for a competitive examination. The medical examiners are well-accustomed to the pale faces, emaciated chests, and thin arms of the applicants; and the only wonder is how they pass any of them as fit for active life.* In truth, many die soon after appointment; for the first access of youthful dissipation yielded to in their earliest moment of freedom from control comes at a trying time after such brain-work as they have undergone.

Against all such competition we protest as unsuitable for the children of phthisical parents. Boys may be sent to a school where something more than the ordinary care is required; but mental pressure is not to be attempted. Wholesome discipline is good for both mind and body; and the boy may be submitted to it along with others, provided that he has reached fourteen years, and has no special ailment.

Violent exercise.

The more violent exercises, as football, rowing races, &c., should be forbidden; and stripping to the shirt, without a substitute of warm woollen clothing, should not be allowed. Crowded dormitories should not be ventured on, not even in the best state of health of the boy.

As regards youthful vice, we know of no agent so destructive in developing the seeds of tubercular disease, and all authorities are agreed in this opinion.

With due attention to these points the boy with inherited tendencies to consumption may go to one of our public schools situated in the country, as Eton, Harrow, Rugby, or to many private institutions; but our great city schools, where the playground is only a partition from the streets, cannot be considered as even safe. It is, indeed, only under certain conditions that such boys

* A recent regulation by the India Board has very wisely decided that the successful competitors for the India Civil Service shall remain two years in England.

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should be sent to any school whatever. And those who are personally feeble should be educated at home.

Stimulants.

The habitual use of stimulants should be avoided by the young with such predisposition to disease as we are now considering. That these agents, so powerful in their effects on the nervous system, should have their advocates as adjuvants in restoring systemic disorder in which vital power is lowered, and the nutritive function depressed, is natural enough. Doubtless they can be made to promote this result when disease of an acute form has altered and diminished cerebral and spinal vitality; or when a poison like typhus has entered the blood, and the action of the heart is failing. In such cases they are direct sustainers, and are available if only to gain time till the true nutrition of the body is restored, and organic life is again set in healthy motion. But their influence is transitory, like the compensating machinery of the watch, and only available for such time as the normal powers require for their restoration.

For the general improvement of nutrition their effects are too evanescent, and the resulting reaction too debilitating. We can scarcely assign them a place as nutritives in the true sense of the word, and as such they would be found inferior in their effects to an abundance of light and easily-assimilated food. Their tendency to induce subfebrile symptoms, rapid pulse, flushing, and undue nervous excitement, can be detected —agencies whose action we should rather avoid in the young and often excitable temperaments we are considering.

There is a period in tubercular disease when wine and even brandy has a direct restorative and sustaining influence; but this does not occur in early life, is never reached in acute or continuous phthisis, and is only to be found when the wave of organic disease, having wasted tissues, lowered nervous power, and irreparably

injured organs of primary importance, retires for a time and leaves the jaded system an interval for repair, when well-directed efforts to assist may find the use of stimulants an invaluable aid.

Tobacco.

Tobacco smoking should never be indulged in at this age. Without entering into the argument as to its general use, there can be no question that in early youth it lowers nervous power, and interferes with digestion and the functions of organic life. Like other narcotic stimulants it may have its use in more advanced life; but for a growing lad it is entirely inadmissible.

Education of girls.

Girls are less subject than boys to some of the evil influences affecting childhood and youth, and more liable to others. The same attention to warm clothing, ventilation, and out-of-door exercise is demanded for them; but the danger is that the latter may be curtailed and the former overdone. There exists the same necessity for fresh air and abundant muscular exertions, and the sedentary habits of the sex should not be permitted to commence. Close rooms, sitting at lessons for hours continuously, and uninterrupted mental attention to any subject, are direct wasters of nervous power in the delicate child. Circulation flags, and the nutritive changes connected with the capillary system are imperfectly performed. Exercise for two or three hours, at intervals, in the open air in summer, or in a spacious room in winter, are essential requisites. A moderate use of gymnastics is of great importance, and we have seen colour, spirits, appetite, and muscular power daily improve by this practice. When the educational period is reached these children should not be sent to school. Home-teaching is far better; for in schools there is no possibility of giving special attention to one weakly girl, even although such may be urgently requested and contracted for by the parents, and faithfully promised by the teachers. The delicate girl is placed in the same atmosphere, in the same school-rooms and dormi-

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tories, ranged in the same classes, and with the same demands upon her time, her attention, and her muscular powers in maintaining the desired posture as her schoolfellows. It cannot be otherwise; school implies all this or nothing. Any exception from such routine would be impossible; for the purposes of educational establishments must be carried out; and if not carried out, in what respects do they differ from home, excepting in the name and in the fewer comforts and lessened attention which it is possible to offer? There is no medical man in practice who has not witnessed the injury inflicted with the best and most honest intentions on young and delicate girls in schools; but then it is the fault of the parents and not of the schoolmistress.

Professions and occupations.

When the period of selecting a profession or occupation for boys arrives, one or two simple rules should guide our advice. Open-air occupations are, of all, the most suitable for those threatened with phthisis.

Farming.

Agriculture stands first, and is recommendable for the exposure to pure air which it implies, for the abundant exercise it involves, and for the simple hours, habits, diet, and amusements which go along with it. The temptations to excesses and the surroundings of city dissipation are not present to entice, nor is the excitement of professional business, political or fashionable life, at hand to urge to a race in which the strong are the winners, and the feeble drop behind. Whether, therefore, this country life implies the being a landed proprietor living on and exercising the duties of his estate; a farmer subsisting by the daily superintendence of his work; a hand-labourer doing the drudgery of toil, and earning his bread literally by the sweat of his brow; or a shepherd in one of our rising colonies; all and each of these occupations are preferable, as offering chances of prolonged life and tolerable health to any town business or calling, to the largest independence as to the meanest drudgery of the city.

Let those who have money, and to whom there exists no necessity for increasing their means, visit the interesting and beautiful parts of their own country. Let them go abroad, and see what is new in institutions, wonderful in natural phenomena, grand in nature, and worthy of study in art. A long and healthy sea-voyage may convey them, in renewed vigour, to the calm and even climates of Tasmania or New Zealand, or the more bracing air of South Australia. Here let them live on horseback, and enjoy all that is new and exciting in these younger nations of the earth. The extremes of climate are not forbidden them, and a winter in Canada, or a summer in Norway, may lend them new vigour. In the pure and invigorating air of the upper regions of Mexico, Oregon, or Peru, in the exciting atmosphere of the Cape, are to be found, it is said, fresh pleasures to the senses, and stimulants to the nervous and muscular powers, such as must be experienced to be described. But man can bear and even profit by all extremes. The relaxing influence of Grecian or Roman plains, or of Egypt; the fresh, dry, and calm Desert air, the life passed in tents, are spoken of by travellers as giving new vigour, from the healthy tone which is imparted to the nervous and muscular powers. We have all met men who have done much of this—cultivated men, and not mere idlers—wanderers of necessity and of liking, who have fought off the inherited taint, and who have lived to old age, hardy and vigorous, and 'temperate in all things.' And this, which need not be an altogether selfish existence, but may include many to help and much that is useful to do, is one of the high and pure enjoyments which in certain cases money is permitted to purchase.

The outline proposed seems Utopian; but phthisis is the disease of the rich as well as of the poor, and the knowledge of what can be done, and what is suitable, should be possessed by every medical man at the pre-

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sent day, when travelling has become almost an institution among us islanders.

Where this plan cannot be carried out, let country life be resorted to, and this is within the reach of almost every one, if certain sacrifices be made for it, and it should be remembered that the greatest of sacrifices is health.

Children of workmen.

But what can we say for the victims of the workshop and the garret who are chained to the oar, and who seem condemned to struggle through the worst influences which town life, unwholesome occupations, close dwellings, improper food, imperfect clothing, and other evil agents concentrate upon them? Even here we may say to the parents of a delicate boy or girl, send the child away, where, if there be lower wages, there is pure air, and less inducement to violate physiological laws. This is often possible: the compositor, or stone-mason, or potter, need not bring up his child to the same trade and the same death as himself. Make a farmer, or a butcher, or a dairyman of him, rather than condemn him to an early death. The tendency of the present day is to concentrate all the population in our great cities, where employment is readily obtained, and wages are high. Let us try and set the current the other way, in the case of those whom, by hereditary predisposition, we recognise to be among the threatened.

CHAPTER XXIV.

PREVENTIVE TREATMENT OF PHTHISIS: OCCUPATION.

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We have been speaking of the prevention of phthisis in those hereditarily predisposed; and, following the child up to manhood, have endeavoured to point out the influences by which disease is engendered, fostered, and developed into actuality, and by avoiding which we may hope to prevent its access.

Occupation a remote cause.

The remote cause of phthisis next in importance to hereditary taint is occupation.

There can be no question as to the influence which it has on the production of phthisis. Other diseases equally chronic are undoubtedly not so much caused by it, for the amount of death so induced is more than that of all other chronic affections put together.

Ventilation.

That which is deleterious in occupations, *per se*, may be referred to the heads of ventilation, confinement within doors, posture, deleterious matters inhaled, and too great prolongation of working hours. Of these, ventilation is probably the most important as influencing the largest numbers; but, if confinement to chambers be added to it, we shall find here the two agents most fertile in the induction of tubercular diseases.

The effect of crowding numbers together without sufficient access of air is well known.

The extinction of disease by altering the unwholesome conditions in which numbers live is scarcely less striking, although less known.

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In their working rooms and sleeping apartments, the lower classes of this and of all other countries are deprived of a sufficiency of air to support vital changes in their integrity. It is not sufficient to measure the exact quantity of carbonic acid which may be present without the extinction of life: a far lower quantity of the impure products of respiration added to the exhalations from the human body, is capable of inducing disease in the system which shall ultimately prove fatal. The respiration of impure air directly debilitates the vital powers, enfeebles the nervous system, depresses appetite, deranges the secretions, and leads to retention of effete matters in the blood. The decarbonisation of the blood is directly lessened by the absence of a sufficient equivalent of oxygen in the respired air, and some * have even gone so far as to attribute phthisis directly to this cause. And whether the retention of carbon in the system be a proximate cause of phthisis or not, we shall do well to consider the conditions under which its exhalation from the lungs is increased or diminished.

Carbonic acid.

The following facts about carbonic acid demand our attention.

It forms about one-fourth of the whole air exhaled.

It contains its own bulk of oxygen.†

About 160 grains of carbon are exhaled every hour in a state of health.

The exhalation of carbonic acid is increased by cold, diminished by heat: at 96° it is half that exhaled at 32°.

It increases after 30 years of age, is stationary after 45, then diminishes.

It is greater in males than in females, lessens during the whole menstrual period of life, augments when the catamenia cease.

* Dr. M'Cormack, of Belfast, has advocated this view.

† See Carpenter: *Principles of Human Physiology.*

It is increased if the menstrual function be interrupted, and during pregnancy.

It is increased in the robust and muscular (rather than by height, breadth of chest, or weight), by bodily exercise (one-third), by eating, by the exhilarating emotions, during the wakeful state, in the early hours of the day.

The opposite conditions to these cause its diminution. It is less in the evening, during bodily repose, and in chronic respiratory diseases, &c.

In most of the conditions which seem to retard the exhalation of carbonic acid, we may recognise those which favour the development of phthisis. A feeble, non-muscular male, insufficiently or improperly fed, undergoing the anxieties of providing for the daily wants of himself and others dependent on him, wakeful and at work during night hours, deprived of bodily exercise, shut up in heated apartments, exhibits the conditions in which the exhalation of carbonic acid is lessened; but are not these the same which are known to lead to phthisis?

Yet the induction of tubercular disease cannot be wholly due to the retention of unoxygenised carbon in the blood.

However much blood changes are retarded and interfered with by it, there are doubtless other agencies necessary before disease is developed into actuality; but here we are only treating of the more remote causes.

Other atmospheric impurities.

The presence of atmospheric impurities in respired air, such as the workers in crowded rooms are compelled to subsist on, becomes an additional source of disease.

Carbonic acid and the purely animal exhalations, act primarily by displacing their equivalent volumes of oxygen; the first, perhaps, wholly in this manner, but the latter most likely have an influence as direct

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poisoners of the blood. We may not know the *modus operandi*, but we are too well acquainted with the results.

The frightful effects of impure air have been witnessed in the army to an extent which is scarcely credible. That the diseases so caused are preventible, is an additional proof of the insalubrity of crowded apartments. The following statement by Miss Nightingale exhibits remarkable facts in powerful language:

Preventible in the army.

'After the Crimean war, it was found that the death-rate among soldiers from consumption alone and its cognate diseases (the monstrous products of breathing foul air), exceeded the total death-rate from all causes among the civil population of the corresponding ages. The total mortality in the army was nearly double—in the Guards more than double—that of the civil community. It is now actually less than in civil life. Only half as many of our soldiers die now as formerly; and in some cases half, in others two-thirds, of the mortality from consumption, has disappeared.'*

In-door occupation.

Confinement within doors seems to be in itself a predisposing cause of phthisis, which, judging by figures, is one of the most powerful.

Among 3,214 men at the hospital (who composed all the cases of decided phthisis which were registered as in-patients in 10 years), more than one-half (1,812) had followed in-door occupations; and the 2,413 females may be said to have been almost all so engaged.

The following table includes sufficient numbers to show this fact. Were it necessary, it could be much enlarged by adding the occupations of out-patients, but with the same result.

* Miss Nightingale: Paper *On Army Sanitary Reform under the late Lord Herbert*, read at the Congrès International de Bienfaisance, June 13, 1862.

*Table showing the Occupations of 5,627 persons of both Sexes affected by Phthisis.**

Males.	
Bakers	64
Bookbinders	17
Bricklayers	109
Butchers	3
Carpenters	295
Clerks and Shopmen	394
Coachmen	211
Gardeners	82
Labourers	539
Mechanics	176
Painters	105
Printers	103
Publicans	46
Railway	38
Sailors and Watermen	74
Servants	285
Shoemakers	171
Soldiers and Police	103
Smiths	89
Teachers	42
Tailors	145
Weavers	11
At home	63
Various	49
Total	3,214

Females.	
Servants	984
Domestic	447
Milliners	397
Laundresses	77
Governesses, &c.	80
Other trades	150
At home	278
Total	2,413

The deductions from the above table are so obvious, as to strike even a superficial observer. If disease of a given form be so associated with certain conditions, that in two-thirds of the instances which present themselves to our notice, these conditions be present, we cannot avoid referring the diseased result to the antecedent error. In other words, deficient ventilation and crowded apartments are eminently productive of tubercular disease.

Posture.

The effects of posture are chiefly observed in bootmakers, tailors, handweavers, and others whose work necessitates the stooping posture. The results are mechanical hindrance to the free entrance of air to the chest, restricted expansion of the bony walls, and an imperfect respiration. In the case of bootmakers, there is the addition of pressure on the epigastrium, which gives rise to the well-known neurosis. But on

* *Second Medical Report of the Hospital for Consumption and Diseases of the Chest.* Churchill: 1863. pp. 6–7.

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the whole, all of the errors of this class are to be referred to insufficient expansion of the chest. Whatever tends to lessen the quantity of air which enters the chest, impedes respiratory changes, interferes with the nutrition of the tissues, and helps to induce those secondary disorders in which organic diseases originate. The first link in this chain may be considered to be an interference with the mechanism of breathing, and it would be difficult to say where and how soon the phenomena of vital disorder supersede or follow on those simply referable to interference with the chemical changes due to respiration. Either from stooping, pressure on the chest-walls, or simply from continuous sedentary position, the respiratory act is shortened, and the blood-changes in the lung imperfectly performed. The nutrition of the pulmonary tissue is also directly impaired. Just in proportion to the healthy activity is the nutrition of an organ, and it is more than likely that when the constitutional disorder has acquired a certain degree of intensity, the localisation of the tubercular deposit may be determined by the weakened nutrition and impaired vitality of the lung tissue which is to receive it. That lessened breath-motion leads to the deposition of tubercle, has been advocated with ability by my late colleague, Dr. E. Smith,* and although the theory of the epithelial origin of tubercle is attached to this statement, and may not readily be assented to, yet of the fact there can be no doubt, that imperfect pulmonary expansion is an exciting cause of tubercle. We here speak only of the elementary principles which should guide our preventive treatment; and when the sedentary so frequently become the subjects of phthisis, we cannot doubt the influence of diminished respiratory movements.

The singular exemption of butchers from consump-

* *Consumption, its Early and Remediable Stages.* By Dr. E. Smith. London: 1862. p. 202.

tion is to be remarked. There are found but *three instances out of* 3,214 which include almost all trades and occupations. The statistics of the out-patients who came under my notice amply confirm the view that this occupation is specially non-consumptive. If we remember that their shops are of necessity airy and open, that they are abundantly fed on animal food, and that from early morning they are rapidly driving about in the open air, taking much exercise, and living well, we shall be able to understand the influences which prevent the access of tubercular disease. These conditions of open-air exercise and high feeding are in fact antagonistic to consumption. If, however, we wish to make a practical application of this knowledge, we must prescribe all of these influences united—for what would the feeding be without the fresh air, and what would the exposure be without the exercise? We are well satisfied, however, that if this mode of life were carried out to the full by those threatened with phthisis, many a life might be saved.

Singular exemption of butchers.

A full action of the skin as ensured by exercise is so important to the preservation of health, that in the consideration of the influence of sedentary occupations, it cannot be omitted. The skin is directly a purifier of the blood, and is associated with the lungs and kidneys in this office. The reactions of the skin are chiefly felt by the lungs. An extensive burn of the surface often proves fatal by a pneumonia. In India, where the air is rarefied by high temperature, the action of the skin is much increased, while the work of the lungs is materially lessened. The blood-changes which necessitate the evolution of carbon and of other products of secondary assimilation, employ these two organs sometimes together, often alternately. The decarbonising and the exhalant functions are shared by both. In all the stages of tubercular disease excessive sweating is a very constant symptom. It is

Full action of the skin.

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difficult, in studying the connection of these morbid processes, to avoid regarding the profuse perspirations of advanced phthisis as not only an effort to throw off morbid matters from the blood, but also as representing vicariously the exhalation of watery matters from the system.* Cleanliness, therefore, which seems almost forbidden by certain occupations which clog the pores, and by close and crowded dwellings which interfere with personal purity, is a necessary condition in all measures preventive of phthisis.

Dust.

The number of persons who suffer from the inhalation of dust in their various occupations is almost incredible. By a calculation made by Dr. Greenhow, it would appear that the preventible deaths in England and Wales from consumption amount to 45,000; or, in other words, if the mortality from phthisis could be reduced to what is presumed to be its normal rate, (3 in 1,000), the saving of life would amount to this; for in many manufacturing districts the rate is 8, 9, or even 10 to 1,000!

It is true that 'dust' is not the only exciting cause at work in the production of pulmonary disease; but it is the chief and most deadly of several deleterious influences to which the workman is exposed. The following have been enumerated as among the most pernicious forms of this mechanical irritant. The dust in hackling flax, in carding cotton, in grinding steel, porcelain, pearl for buttons, in potteries, among mattress makers and cleaners, among chaff-cutters, stonemasons, needle-polishers, and in mines where the exposure to metallic dust is a fertile cause of phthisis. 'Few men who enter certain rooms in cotton factories ever live to attain 38.' 'Out of 27 men in a flax-

* The improvement in certain cases of phthisis which have resulted from the use of the Turkish Bath is curious as bearing on this point. In several instances we have witnessed a remarkable cessation of hectic sweatings after a few baths,

hackling factory, 23 had pulmonary disease,' are the statements made.

Preventive measures.

Fortunately their capability of prevention has been equally proved. In certain well-ventilated mines the mortality is one-third less than in others, and the simple use of the fan in workshops has materially lessened the quantity of disease among the grinders of Sheffield.

Dr. Greenhow points out that the potter's consumption is chiefly caused by portions of clay being allowed to be trampled into dust on the floors of the work-rooms.

Inventions to prevent the entrance of dust into the air-passages have often been devised, and many of them have been sufficiently tried to warrant their adoption. Such are the use of a veil over the nostrils and mouth, and in men the growth of the beard. A perfect ventilation and extreme cleanliness are, however, the best modes of prevention. The metallic dust in mines, the floating particles of flax, cotton, and straw, are all possible to remove, rather let us say impossible to continue, in the presence of a good system of ventilation. Nor is it necessary, in the opinion of the most competent observers, to subject the inmates of these mines and factories to a current either of roasted dry, or of cold and damp air. Many experiments have failed because of the injurious effects of these currents, which are intolerable to persons exposed to them. It is perfectly possible to obtain warmth and freshness of the air supplied without a draught, and without over dryness and rarefaction. It it notorious that such workmen are very sensitive to sudden changes of temperature, as their mucous membrane has been already rendered irritable by contact with atmospheric dirt. But it is quite certain that a steady current of warm and moderately dry air may be obtained without causing chill. Such at least is the united testimony of the best observers.

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Over work.

Over work means exhaustion of organic life. The muscular apparatus of the body has a limit set to its exercise, beyond which any strain is a breaking power. Like all the rest of the animal mechanism, it has a reserve of force for occasions outside and beyond the ordinary requirements made upon it. A man may walk, under extraordinary circumstances of pressure, say five miles an hour; but no necessity or reward could make him walk seven. The final spirt in the boat-race can be got up by a hardy crew determined to win, even when well nigh exhausted; but the continuance of such effort would be impossible. But to what is called organic life there is no such direct limit. It is capable of sustaining gradually increased pressure, under which its resisting powers at first increase, then lessen, but continue to tolerate with increasing feebleness the oppressing agents. The victory is finally against the organs, but the struggle is prolonged, and in its first period of resistance it is amazing what an amount of latent vital vigour is called into activity. The reducing process is, however, progressive and certain. Over strain of mind and body; hours given to intellectual and bodily labour which should be devoted to rest, directly waste cerebral vitality and impair the nutrition of organs. There is one part of the machinery which never sleeps—the spinal centre; but finally it loses power, and the organic movements over which it presides become impaired, lowered, and exhausted. The blood-changes necessary to the formation and support of healthy tissue soon yield after this, and tubercular degradation is one of the results.

But we cannot leave this part of our subject without calling loudly on employers and philanthropists, and all who are connected with labour in every form, to amend the conditions on which work must be now performed.

The amount of preventible disease is astonishing,

and we are almost compelled to cry out, 'Why will ye die?'

Labour is fairly paid for now-a-days; that is, skill and time are rewarded; but no wages can compensate for disease and death.

Why should tailors work in steaming hot rooms, the very air of which is deadly, crowding in together, with not one hundredth part of the respiratory space necessary to support life—the skin clogged, and the lungs gorged by their own foul exhalations?

Why should young and delicate girls be crowded into hot rooms, given insufficient time for food, and but half time for repose—rooms which dare not be ventilated, we are told, for fear that atmospheric impurities should stain the costly dress which is being worked at, while the deadly impurities with which the lungs of these workers are continually infected are never considered for?

Why should stone-masons, potters, and others inhale a deadly dust, and so certainly induce a disease whose mortality can be easily reckoned in the fearful percentage which their insurance societies record in their reports?

Why should compositors work in a deadly atmosphere of heat and foul air, crowded up into the garrets which we may see glowing into the night air as we pass the offices of our journals?

Why should men be put in cellars, where no daylight ever reaches, to perform work which would be better done in the face of the sun, and at less expense?

These conditions are all preventible causes of disease. There is great outcry about drainage, and from Windsor Castle to St. Giles's some would profess to trace the origin of typhus and other animal poisons to foul matters retained within our dwellings; and considering the amount of impurity underlying most of the best of

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London houses, it is wonderful that we do not all die of typhus, or some other form of blood-poisoning. But the amount of such diseases and the resulting mortality is as nothing compared to the work of death done by crowding, heat, and exhalations from living bodies. The preventible causes of chronic disease are, in other words, a hundred times more prevalent everywhere than those of acute.

There is actually no reason why such conditions as we have named should not be swept away, and with them the inevitable amount of death and disease which now is dependent on them. Work would be better done, and more labour got out of the workman, if he were to do it in spacious, airy, and light halls, instead of in dark, confined, and poisonous back rooms. But for this capital is required. True; but capital can be found. At present it is outlaid on that which meets the eye; on the reception-room for the customer, and not on the workshop for the men. Reverse the proceeding, and a remedy is applied which will repay both masters and men; a higher class of work will be produced, and the producing powers and duration of life of the skilled labourer be vastly increased. Something is being done in this direction, but much more is needed, and the improvement of the dwellings of the working classes is as much demanded as that of the unwholesome apartments in which they are crowded during business hours.

Privations and vices.

Of the other remote causes of phthisis, the privations and errors of life in individuals, it is not necessary to treat at length. All that exhausts vital power prepares the soil, and leads the way to diseases of degeneration. But something more than this is necessary, and it seems probable that the additional element is hereditary taint, near or remote. It is very remarkable how much misery of mind and body, how long a continuance of exhausting vices may be persevered in, without the

indications of tubercular disease. Yet, on the other hand, it occurs to us all to witness daily how the pressure of mental distress, anxiety for the provision for daily wants, and the harass of business, breaks down the finest constitution. In so far as these causes are preventible, all would gladly avoid them. When present, they are rarely susceptible of removal; and when absent from the favoured condition of the few, the enemy is apt to creep in through some other door. We need not dwell on them longer in the light of prevention, but a warning must be held out to those who embark everything in the great life struggle, instead of allowing only a certain and limited stake to depend on the issue.

Against the vices of life—the preventible, fruitful causes of organic disease which depend on our own passions—the moralist and the physician take common ground. A large experience has persuaded us of the deadly influence of youthful vices, and of the excesses which go by the name of pleasure. These are preventible causes of disease; but it is to be feared that medical warnings can do little towards their eradication.

CHAPTER XXV.

THE SPECIFIC TREATMENT OF PHTHISIS.

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Specific treatment.

THE specific treatment of phthisis has naturally received much attention, and very many remedies have been in turn proposed, tried, and abandoned, which have been supposed to possess a direct antagonistic power over tubercle.

An enumeration of these means would show the various theories which have induced their trial, but could not add much to our knowledge of the disease or to our faith in drugs. To some, indeed, no theory whatever has been attached, and such are merely the result of a blind empiricism. Even down to the latest date, however, are to be found men educated in pathological science who uphold that certain substances possess the required power, and that, if their administration be only timely and sufficient in quantity, a cure may be effected. That these articles include the most widely-differing agents, every form of chemical opposite —acids and alkalies, every variety of vital alteratives, sedatives, and stimulants; promoters of absorption, as mercury and iodine; direct nutritives of the blood, as oils and iron; and feeders of special tissues, as phosphorus—is well known. To us the question remains, not from which of these classes we shall select a remedy, but whether any specific is likely to be found which shall possess the required powers.

The above have been tried again and again with

only disastrous results where cure is regarded, and with no certified specific action in any case. This may seem a bold assertion, but its truth is recorded in many a failure, and it can only be denied by the ignorant or interested.

It is, indeed, curious to observe how specific medicine is declining. Even syphilis, for which we seemed to possess a formula of undoubted power, and of such universal application that the practice of all countries had agreed on its use, has ceased to be treated with mercury, and we have lived to see able observers and good pathologists recommend that this powerful drug should in no case be resorted to.

Nor has the iodine treatment more advocates, while such remedies as sarsaparilla and nitric acid are almost obsolete.

Perhaps no drug has held its place and sustained its character like quinine, and doubtless with reason, but its antiperiodic powers are lately much less believed in.

Certain remedies of short-lived fame, like the Sarracenia purpurea for variola, have been heralded as possessing great powers, tried, and abandoned.

That the philosophic spirit of the day is opposed to the doctrine of specifics is very evident; yet, with an experience that there are fashions in medical practice as in all other things, we shall do well to content ourselves with a modest and moderate adhesion to the doctrines of this or of any time.

We are apparently in a transition period of unbelief, and it is possible that we are not looking at or for remedies with anything like the earnestness with which our ancestors sought them. The foundations of medical science are, in fact, undergoing rearrangement. Our knowledge of structure, of function, and of vital changes, was found to be partial or incorrect, and, doubtless for sufficient reasons, the attention of the profession is being directed with all its keenness of observation to a

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rectification of these important ground-works of all medical science.

Diseases have changed their names as different structural alterations have been discovered, and we are no longer led by nomenclature as we have been, knowing that it is doubtful how long the most approved can stand the test of observation.

The individuality of disease is getting to be doubted also. Formerly it was the organ affected, or the deposit in tissues, or frequently only the secondary effects of deeper causes, which gave a name to the disease. Now, as a higher research ascends the vital chain of causation, we detect earlier deviations from health than those which become manifest in the more active symptoms of disorders, or even in the post-mortem examination; and we are compelled to doubt the accuracy of the title which more superficial observers, with lower powers than our own to assist them, may have given to the disease we have to treat.

Nothing can more shake our confidence in specifics than this shifting of the seat or primary cause of disease as an accommodation to the views of later investigators, for the essential condition required for the action of a specific is that it shall address itself to an individualised and perfectly certified affection. If the disease be not really what was supposed, but some aberration higher up in vital changes, our specific loses its application; and just in proportion as the powers of the remedial agent are defined, so does it necessitate for its successful use a definite and certified malady.

Thus it would appear that the changes in pathological definitions, which are necessary results of increased knowledge, have interfered with our faith in specifics.

But something higher still in our recent advances opposes the doctrines of specific medicines. Vital changes are not single, but multiform. There is, perhaps, no isolated and perfectly unassociated morbid

phenomenon in the whole history of disease; and probably there exists no single cause to which, as to a fountain-head, we can refer any deviation from health. This is certainly true of organic changes, if less apparent in those which we call functional. How, then, shall remedies of single operation address themselves to a multiform origin of disease? Nor is the seat of morbid actions so defined as to afford an isolated mark to the best directed specific remedy.

To take pulmonary tubercle as an illustration. It is a compound body, imbedded in a complex structure (the lung) whose vital relations and reactions supply the real events of its history in the economy. Supposing the deposited tubercle to constitute the disease (which it does not), its reactions on the system are to be represented by pulmonary irritation involving all the tissues of that complex organ, and reflected on its nervous and vascular relations, which are extremely complicated and exceptional. But supposing the deposited tubercle to be, as it really is (and not as it seems to be), not the disease itself, but a secondary, or it may be a tertiary, result of pre-existent systemic disorder, of grave alterations in the assimilating processes whereby blood becomes structure; or, higher still, of blood-making in its vital sources, in which are implied sound innervation, perfection of various secretions, and vitalisation of many constituents; we are lost in the attempt so to define the *fontem et originem* of disease as to adapt the most cunningly-devised remedy to the condition to be altered, assisted, or reversed.

From considerations such as these, the philosophic mind of the day will not readily assent to any proposition implying a direct assault on the supposed seat of any constitutional malady—and all organic alterations originate in constitutional disorder. We may seem to some to narrow the limits of action of our remedies;

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but the first step in such an enquiry as the present is to define what it is possible to do, and that which clearly lies without the domain and province of art.

Our next is, doubtless, to ascertain whether, if combined vital actions in their aberrations from healthy unison cannot as a whole be changed by any remedy, we may not be able to modify single and well-recognised deviations by certain well-selected agents.

And here, if anywhere, are to be found the hopeful indications for treatment in a constitutional disorder like phthisis.

That medicinal agents have certain special powers is not to be denied. It is their capability of remedying certain diseases in their nature complex, and not their ability to effect alterations in given conditions of vital actions, against which we contend. Thus, a deficiency of red corpuscules can doubtless be remedied by iron, and the fatty tissues can be nourished and a richer chyme prepared by the use of fish oils, and old deposits of inactive character can be rendered more susceptible of organisation and therefore of removal, and absorption of the plastic exudations of inflammation can be stimulated and hastened, and excessive secretions can be restrained and so waste prevented; well-selected tonics may be addressed to and will reach the muscular apparatus of the hollow viscera, and the nervous system be strengthened by the same remedies. Or by a numerous and valuable class of agents, the direct sedatives, we can lower nervous susceptibility to reflex impressions, lessen the respiratory requirements of the system, diminish nervous waste, and vastly assist in restoring our patient to a condition favourable for the resumption of the vital actions which constitute health.

By the use of these various agents pain may be relieved, nutrition reinforced, the blood may be fed, and the nervous system invigorated, excessive secretions and muscular waste may be arrested; and if any

of these indications be fulfilled by our remedies, we shall not have been engaged in a vain struggle with disease.

A large number of organic affections derive their leading features from local inflammatory actions. In combating these by local depletion and repeated counter-irritation, we are ministering to the arrest of the disease itself; for if the inflammatory element could be deducted from these constitutional disorders, a most important advance would be made towards their cure.

CHAPTER XXVI.

THE DIRECT TREATMENT OF PHTHISIS.

The Premonitory Stage.

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Direct treatment.

The premonitory stage.

THIS has to be considered with regard to the different varieties of the disease, and its various stages.

In considering the 'premonitory stage' of phthisis we cannot consent to a definition which includes any manifest changes in the physical condition of the chest. It has been argued that feebleness of respiration, and slight general dulness of the percussion-note, prolonged expiration, with some impairment of the mobility of the chest walls, are characters which accompany the 'pre-tubercular stage.' But these are some of the actual features by which we recognise an already established deposit. Where, then, shall we draw the line? or, can we, to suit a theory, presume that with these altered physical conditions there does not already exist some amount of structural disease? But when to the above physical signs we add the symptoms which are said to distinguish such 'premonitory stage,' viz., hæmoptysis, cough, and progressive emaciation, we find ourselves at once in the presence of the history of established tubercular disease. Short of actual demonstration by post-mortem examination, there can be no proof of this group of physical signs and of symptoms being present without any deposit in the lung.

This early period of threatened or established tubercular disease has also been designated 'the remediable

stage of consumption.' If remedy mean cure, it becomes a matter of experience whether this stage of established disease (as we believe it to be) is more capable of entire removal than any of those later in the history of the affection. When tubercle is once established as a deposit, its absorption, or cretifaction, or softening and removal, with ultimate cicatrisation of the cavity, are possible events, as we have seen.

But these occurrences are rare, and cannot be reckoned on in ordinary practice. In the preceding pages cases have been given illustrative of each of these events; but the whole experience of the writer goes to prove that every stage of phthisis is 'remediable' in the common and true sense of the word, and that to apply the term to one early and, necessarily, limited period of the affection, is to contradict the daily testimony of experience. Let us boldly say 'curable' when cure is meant, and the expression cannot be confined to any stage of the disease. But, while all that is helpful by restoring the weakened processes of nutrition, by abating the congestion of the lung surrounding the seat of deposit, by lessening and controlling every drain on the system, and by exalting the nervous vitality of organs, is at our command in every stage of phthisis, and is found serviceable in arresting the destructive progress of tubercle, whether as a deposit in the process of softening, or in the achieved mischief of cavity, we cannot consent to limit the term 'remediable' to any stage of the disease.

In a former chapter we have dwelt on the features which distinguish the period preceding deposit in the lung, and it has been argued that alterations in the nutrition of the body are in every instance, excepting in acute phthisis, the forerunners of tubercle. We cannot draw the line, nor say with certainty when local disease has taken place; but the earliest appreciable occurrences in the history of the disease are emaciation

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and a subfebrile state. This statement is not offered as a theory, but as the simple result of unprejudiced observation. It has not appeared that appetite is much impaired at this period, or that the loss of flesh can be attributed directly to diminution of the quantity of food taken. Men grow thin and fall into phthisis, who are partaking daily and largely of food of the best quality, containing every element necessary for its conversion into healthy blood. It is not usual to find appetite impaired in this earliest stage, at least to an amount which could at all account for the emaciation. The primary changes of digestion are generally sufficiently complete, but the secondary and higher vitalising actions by which food is made into blood, and blood becomes tissue, are not performed efficiently. It has not appeared that 'elimination' is, as a rule, so excessive as to account for this early emaciation. There is generally an access of severe sweating, a febrile access, such as occurs in the later stages as the result of irritative action, but this subsides. The skin is not always moist, on the contrary it is often dry, and the pores seem closed, and dry heat is very commonly complained of.

Guiding principles.

The principles which should guide us in treating this constitutional disorder appear to be the following:—

1. To promote healthy blood-changes.
2. To maintain full respiratory action.
3. To eliminate morbid matters from the system.
4. To supply the largest amount of the most nutritive food which can be digested.

To promote healthy blood-changes. Exercise.

1. The promotion of healthy blood-changes is best accomplished by exercise. The active renewal of tissues is stimulated by their waste in a normal exercise of their functions. The intimate changes between blood and tissue, in which the former is raised into a higher grade of vitality, are constantly going on. But their rapidity and perfection is dependent above all else on a due exercise of the vital functions which are appro-

priate to the tissue. Should muscle be employed, we are aware that its circulation is increased, its growth accelerated, its bulk enlarged, and its innervation raised by the very fact of its activity. Thus the arm of the blacksmith, the legs of the runner, and the chest muscles of the athlete, increase in size and in power. A more rapid conversion of the nutritive material is effected, and a more rapid waste takes place. If these processes are balanced, the system is no gainer, but an excess of the nutritive over the expending actions is so invariable, that greater volume of tissue is an almost constant result. This increase of bulk is, however, but the end to which a series of vital actions lead. The final step by which the corpuscule deposited is assimilated to the actual form of the tissue to which it is applied, is only the terminal and culminating event in a series of nutritive actions. Backwards in the chain we can recognise increased innervation, stimulated circulation, improvement in the quality of blood formed to meet enlarged requirements, secretions increased from liver and pancreas, respiratory movements and results augmented, till the stimulus reaches the organs devoted to the supply of the primary elements necessary to nutrition. Here the purely gastric and preparatory processes are stirred into activity, and chyle and chyme are prepared of a higher quality, while the demand for food is exalted. These results of bodily exercise are far from theoretical. Let anyone accustomed to the sedentary occupations of town life take an autumn holiday in mountain scenery, and mark the results as he daily increases his muscular activity. At first there is fatigue, because he has drawn on his ordinary powers supplied by his ordinary recruiting forces. But backwards in the chain we have traced, his innervation, sanguification, and appetite increase, till every vital process is quickened, and with enlarged demands, his system is stimulated to produce a greater quantity

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and a much improved quality of nutritive blood. Temperature rises, the colour of the surface becomes ruddy, respiratory changes are increased. He is throwing off more water from the skin and lungs, and more carbonic acid. The bowels become inactive, on account of such diminution of water. But voluntary and organic muscles alike improve in tone and in vigour, and the heart's action is strengthened, at the same time that the muscles of the limbs become fuller and firmer. By daily exercise pushed to the verge of fatigue, every vital action is stimulated. Such changes have been attributed to the absence of city habits and of city cares, but no one who has tried these experiments on himself can doubt the improvement in vital powers, nor that it is due both to the removal of unhealthy influences, and to the organic changes being stimulated into activity by abundant exercise in fresh air.

In this so-called 'premonitory stage' of phthisis, where the symptoms we have to combat are diminished activity of vital processes, leading to the formation of an imperfect blood plasma, and secondarily to all the phenomena of lessened nutrition, we say let the patient take daily exercise of an active kind in the purest and most bracing air, and let muscular waste be stimulated, in order that muscular enlargement and nutrition may be increased, and that all the vital processes concerned, eliminative and reparative, may be alike roused into activity.

For this purpose exercise in the open air is imperative. The atmosphere respired should be pure, dry, and bracing. If the season be summer or autumn, an elevated locality with the perfect drainage natural to a sandy soil or a greatly inclined surface should be selected, and in order to encourage increased respiratory effort and expansion, a hilly or mountainous neighbourhood is the best. Dryness of air, promoting perspiration and pulmonary exhalation, is also most

desirable, and within certain limits, a lessened barometric pressure is desirable. It will at once be seen that these requirements cannot be met by a residence in a very hot climate, for here we have increased rarefaction of air, with no diminution of atmospheric pressure. Even in India and Jamaica, however, the relief obtainable in consumption by rarefaction is great, although temporary. Happily, we can find nearer home localities well adapted for the ends proposed. In summer the Pyrenees and Switzerland offer exactly the conditions required, and of these the former is preferable, for the climate is more uniform, and, excepting in the lowest and most sheltered valleys, the temperature is not excessive. But Scotland, Wales, and our Lake District afford almost all that is necessary. High mountain ascents are not only unnecessary, but would be injudicious, as taxing both muscular and respiratory powers excessively. But wherever there is a high, sunny slope, and bracing air to be got at, let our threatened consumptive ascend it, slowly at first, but with a daily increase of the time and labour spent in the achievement.

The exercise of the upper extremities and of the chest muscles is also most advisable. Walking, which is the mode proposed, and happily is within the reach of every one, implies a certain activity of arms, but it is not sufficient, and exercises of a gymnastic kind, gradually increased, are to be diligently used. It is well known that such muscular movements of the upper half of the body will more rapidly and effectually strengthen the digestive processes, than an equivalent amount of walking. Rowing, if practised in moderation, is an excellent mode of improving the arm and chest muscles.

Should the season of the year not permit of out-of-door amusements of this kind, dumb-bells at home, and some of the well-contrived apparatus for arm

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and back exercise should be daily made use of in the house, and with open windows, even in winter. We shall thus promote muscular and respiratory changes together.

2. To maintain full respiratory action.

To maintain respiratory action.

This is the second indication, and it seems almost part of the first. Although, however certain means may be adapted to answer both requirements, respiration having different ends to fulfil from any merely muscular part of the animal frame, must be considered and provided for separately.

Within certain limits the vital and chemical changes due to respiration are increased in proportion to the frequency and fulness of the pulmonary expansion. This is explicable without adopting the doctrine that there is partial collapse of the lung-cells, and impaired elasticity before the deposit of tubercle. The broad fact is most evident to all enquirers, that the sedentary occupations which imply a shallow and imperfect respiration are those which most readily induce consumption. Whatever be the nature of the disease, its most frequent seat is the lung, and the physiological law is true here, that the full and healthy exercise of an organ is the condition best calculated to maintain its structural integrity. Even were there no chemical or vital phenomena dependent on respiration, the entire activity of the lung viewed merely as a tissue would be thus best preserved, that is, its circulation and nutrition would be at their highest. But when, in addition, the important changes of which it is the seat are considered, this necessity will be doubly manifest. The air-cells are capable of expansion to twice their ordinary volume, without injury to their elasticity, and we may presume that their respiratory capacity in a vital sense is raised in proportion.

The undoubted fact noticed elsewhere, and confirmed by many observations of different authorities, that general emphysema of the lung is a rare combination

with phthisis, may perhaps be taken to confirm this view, or at least may be allowed as evidence that increased size of the vesicular cells of the lung is antagonistic to the deposit of tubercle.

The modes of increasing the expansion of the lung are various. None is better than walking briskly; climbing a hill may be next attempted; rowing, running, and horse exercise, if not carried to excess, are highly useful; and for feeble persons the first attempts may be made at home, by reading aloud, singing, and the practice of sustaining a note preceded by a deep inspiration, and of course followed by one.

The practice of making deep and forced expansions of the chest, which can be taught to most persons, has been highly recommended by Dr. E. Smith, Piorry, and others, and fulfils the same indications; but this ought to be an addition to, and not a substitute for, brisk exercise in the open air. The playing of wind instruments has been advised, with the same view. We have had some cases at the hospital which seemed to favour their use, but the impression left was that the practice was often productive of hæmoptysis, thus evidencing a tendency to induce congestion of the lung. We should hesitate to recommend it, believing that the same amount of benefit may be obtained by some of the other modes mentioned.

Various instruments have been proposed to promote expansion of the lung, by increasing the mechanical difficulty, either of inspiration or of expiration, or of both. To those which interfere with the entrance of air, there are objections: the class which renders its exit difficult is more rational. Yet when deep voluntary inspirations can be practised in pure air, or when some of the exercises proposed are equally efficacious, and additionally recommended by their exhilarating effects on the patient, we presume there can be no question which are the more suitable.

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Elimination of morbid matters.

3. The elimination of morbid matters from the system is of highest importance theoretically. Practically we are often at fault, even when the indications are most marked, for relief in this direction. The pathology of the present day favours the idea of matters retained or generated in the circulation, which either act as poisons to the system, or interfere with its normal actions. When we come to examine the modes of exit which are open to them, and when we analyse the secretions which they may be supposed to influence, we are compelled to admit our comparative powerlessness in removing these morbid products. The truth seems to be, that the excretions of the body are the products of the food ingested, and of the detritus of normal tissues, rather than the poisons which induce disease—if indeed any organic affection be due to a specific contamination of the blood.

It is probable that two things at least are needed for the production of organic alterations—disordered blood constituents, and local impairment of some one organ whose actions are normally connected with the assimilation of such constituents in time of health, or their elimination in diseased conditions.

Difficulty in altering the quality of secretions.

In considering the healthy action of the secreting viscera, we are struck at once with the difficulty of adding any constituent to the usual matters which it is their office to separate from the blood. We can more easily increase the quantity than alter the quality of such separated material. Thus, diuretics will stimulate the kidney to a greater secretion of water, but the other constituents of urine are less affected by such stimuli; and we are wholly at fault when we endeavour to procure the elimination of other than the ordinary healthy ingredients. Unless, therefore, such poisons as we presume to exist in the blood can be converted into urea or some of the other forms of the egesta by this organ, the proofs of their removal by

tests and other modes of appreciation are exceedingly difficult, if not hitherto impossible.

The skin and mucous tract.

The skin, in addition to its ordinary exhalation in health, may be forced to give out some of the constituents of urine ; and it is likely that as an occasional agent in the removal of matters not contained in its ordinary secretion, it is capable of affording greater relief to the system under extraordinary conditions than even the kidneys. We are led to this conclusion from the consideration of the natural processes of many diseases manifestly of blood origin. Thus the poisons of scarlatina, variola, rubeola, and of syphilis, seek an exit on the epithelial surface of the body. The ancients looked chiefly to the skin for elimination, and the critical sweats and external abscesses of which we read were regarded as purifying processes, by which the blood was freed from contamination. The internal mucous tract, which is so clearly allied in structure and in function to the skin, is also an eliminator. The lungs perform the office of exhalants ; and, as we know, are the medium of the oxygenising changes between the atmosphere and the blood. But doubtless other matters, too subtle for our analysis, are constantly passing out of the body through this channel, which is unceasingly at work. The system, as a whole, presents an invulnerability to external agencies ; and being compelled to exist in the presence of so many poisons, atmospheric and contagious, exercises not only a repellent power, but is also endued with the ability to give off these noxious agents from its various emunctories in a harmless form. Else how should we continue to exist in the midst of the various contagions to which we are daily exposed ? With every breath the subtlest elements of destruction are drawn into the interior of a sensitive membrane engaged at all times in absorptive processes, yet still we are safe !

Yet, after a due consideration of the repellent power

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and the eliminative actions, we stand compelled to wonder at the impermeability of vital processes. The agents by which we compel increased secretion address themselves to the habitual, but leave untouched the occasional products of the blood; and while we can stimulate the former almost to an unlimited extent, the latter remain unaffected in face of our most powerful remedies. Vital chemistry is more potent than any inorganic reagent which we can bring into contact with it; and the body returns our most active drugs unchanged through its ordinary outlets, or stores them up in its organic structures unaltered, and so little oxydised that their solution is impossible. Thus, mercury, antimony, and other metallic remedies, to which we look for most active results on organic life, are found long after their administration imbedded in the viscera.

We can, however, gather from a study of natural processes, that the system in its attempt to disengage itself from organic poisons, makes a violent effort, evidenced by much constitutional disturbance, and in eruptions, increase of watery secretion, and in acid and other additions to the natural constituents of perspiration; and by conversions into oxalic acid and urea, endeavours to throw off something offending the system.

From this it is proposed to gather the indication that nature should be imitated, and that the skin should be called into eliminative activity in the threatened stage of phthisis. We have fairly stated above some of the difficulties which attend this question, and the subject has not yet been sufficiently investigated to permit of more than surmises, but it seems most likely that good may be effected by various modes of promoting elimination from the skin.

Amongst the means most adapted for this purpose, the hot-air bath is the most efficacious. In a short time we hope to give it a more extended trial, but as

yet only a few cases have been subjected to its full use. Through the kindness of Dr. Leared,* we have been permitted to examine several patients who have undergone prolonged courses of the Turkish bath. They were all in the stage of softening tubercle. The results may be briefly stated to be, that the progress of softening was checked, the moist crepitant sounds were replaced by a dry crackle over a less extended portion of lung, and the hectic sweatings ceased. These men were exposed to a temperature of dry air at 125° to 145° for from five to eight hours daily. They were pale, but their average weight was not diminished, and excessive waste appeared to be checked. The regulated use of this agent may be found beneficial in the treatment of the 'premonitory stage' of phthisis. The remedy must not be pushed so as to induce exhaustion, nor must the seclusion in hot chambers be carried to the extent used in the above cases, for the deprivation of fresh air and of light is a serious loss to the patient. As a means of eliminating through the skin, it may also be fairly doubted whether these baths can compare with brisk exercise in the open air. From personal experiments, we believe not; and have found that all vital processes are more increased and invigorated by muscular exertions than by the stimulant of heat applied to the inactive body.

Turkish bath.

In considering the means at our disposal for removing a supposed noxious agent from the system, at a time when our theories and observations point to blood contamination, but not yet to established local disease, we are naturally led to notice the presumed action of such agents as mercury and iodine. Our experience would lead us to avoid the employment of these in all cases of lowered vitality. The action of mercury in breaking

Mercury. Iodine.

* For Dr. Leared's cases of phthisis treated by the Turkish bath, see *Lancet*, Nov. and Dec. 1863.

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up tissues, and, as some assert, in causing the destruction of blood corpuscles, seems directly contrary to all the indications in such cases, and in practice it is found to depress the nutritive powers. As an alterative and absorbent, iodine has its uses in certain cases of established phthisis, but in the stage we are now considering it is less serviceable; nor after many trials can we offer any facts to prove that it possesses specific powers in arresting the blood changes which lead to tubercle.

Nutritive food.

4. To supply the largest amount of the most nutritive food which can be digested.

In the majority of cases a fair average appetite is maintained in this stage, unless during the actual febrile access, and in instances of acute or continuous phthisis. With long-continued impairment of digestion, the prognosis in the premonitory period must be bad; but, under ordinary circumstances, a fair amount of food can be taken.

To quicken the assimilating processes, it is far better to excite by creating a demand for food from having taken exercise than to trust to a tonic. By such exercise as has been described, we can generally manage this. A steady effort must be made on the part of the patient and his friends to have frequent moderate quantities of highly nutritive diet made use of. There can be no question that the blood must be fed with all the constituents necessary for the support of the organisation. For this purpose, milk stands at the head of all other food, being easily assimilated in most cases, and containing a large quantity of nutritious material. Bread, with milk, eggs, and fresh meat, twice in the day, with a due admixture of green vegetables at the proper season, may constitute the ordinary diet. In certain instances, however, milk may form the chief article of food, and we have witnessed cases in which seven or eight pints have been consumed in

Milk.

the course of the day with remarkable benefit. Other food was, of course, taken in less proportion; but on this plan we have known twenty pounds in weight regained in six weeks without the administration of any medicines.

To pass a large quantity of food into the blood, and thus to enforce a more frequent renewal of that fluid, is one of the objects effected by a very full milk diet. The skin and kidney functions are at the same time quickened. Even a very feeble digestion may be encouraged to take up milk in increasing quantities.

'Cure de raisin.'

With a view to encourage rapid blood alterations, the ingestion of large quantities of grape juice has been recommended, and this mode is carried out to a very large extent in many parts of Switzerland. It is not for a moment to be supposed that persons undergoing this system consume nothing but grapes, for a tolerably liberal bread and meat diet is allowed. Good effects doubtless follow in many instances, but as a nutritive agent milk must stand much higher. Indeed, the constituents of grape juice are insufficient to maintain animal life. In our judgment, no better plan could be adopted in threatened phthisis than (where means and the season of the year permit) to take up a summer residence in the Pyrenees or Alps, in some of those numerous open valleys in the pure air of the middle region, where the pastures are rich, and with daily exercise in proportion to strength, and gradually increased, to try the daily ingestion of large quantities of milk of the purest quality.

Oil. Iron.

The medicinal agents which feed the blood are not to be forgotten. Cod-liver oil and iron are among the chief of these. The counter-indications for these are a furred state of tongue and nausea for oil, and a febrile state for iron. But where there is exhaustion and waste of tissue without fever they are of great value, and should never be omitted. The waste of the fatty

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constituents of the body is well and rapidly supplied by oil, and the known deficiency of red globules in phthisis offers a decided indication for the use of iron.

Chalybeate waters, which contain exceedingly minute quantities of iron largely diluted, form a favourite mode of administering it. The injection of so much fluid before food has often injurious effects, and we have seen the waste of flesh rather increase under their use. Again we have known the tubercular attack precipitated by chalybeates taken while the febrile access was marked. But with certain cautions, many cases benefit by their use, which should be under medical, and not empirical management. Of all the preparations of iron, it has appeared to us that the sesquichloride is the best, producing the characteristic effects proposed in a shorter time, and with greater certainty than the others.

Dangers of iron.

It will be remarked that, in considering the treatment of this premonitory stage of phthisis, we have dwelt rather on the resources which are derived from an observance of the natural rules of health, than on those which are found in the use of drugs. In the absence of proved specifics possessing undoubted power over blood changes and the more obscure processes of nutrition, we are compelled to assign the highest place to the means which are placed within the reach of all for the maintenance and restoration of vital functions. So long as secretion, elimination, and the normal growth of healthy tissues can be promoted by exercise, fresh air, and nutritious diet, we are bound to assign to these the highest place as restoratives. Whether the tubercular deposit be the residual matter of an inferior quality of blood, an excess of crude material which the enfeebled system cannot raise into organisation, or an altered form of existing tissues, it is evident that the events on which depend the formation of a perfect blood plasma, are those to which our remedial efforts

must be addressed. When such deposit has occurred, the local symptoms immediately rise into importance; but up to the moment of that event, all that can enable food to be converted into healthy tissue should be diligently sought for and supplied.

CHAPTER XXVII.

TREATMENT OF THE DIFFERENT STAGES OF PHTHISIS.

THE FIRST STAGE.

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Treatment of the first stage.

Congestion of the lung.

THE local symptoms rise into importance from the moment that we can by physical means certify the existence of deposit in the lung.

In studying the earliest signs of such lesion, it will be evident that they are due to congestion of the lung. The amount of deposit at this period is in ordinary cases too small to account for the extent of interference with respiratory space, which is indicated by the amount of dulness on percussion, and lessened respiration. The symptoms also, and very commonly hæmoptysis to some extent, indicate considerable pulmonary congestion. It has become evident that vesicular portions of the lung are blocked up, and that pressure is exercised on the vessels supplying it with air and with blood. The results of local depletion evidence the same fact, for a considerable amount of dulness at the apex can be removed by leeching or cupping. It is obvious that under these circumstances the tubercle is not absorbed, and our experience tells us that the congestion can by such means be removed. While, therefore, we never forget that we are dealing with a constitutional malady with local results, our first care in this declared stage of lung disease should be to remove congestion.

In every stage of tubercular disease of the lung, the pulmonary irritation has to be regarded as the cause of

a large proportion of the symptoms. The constitutional disorder often pauses when the local begins, and with the effusion of a crop of tubercles, we may find that we have in practice to oppose a localised pneumonia. Local depletion cannot be too strongly urged as the necessary, if not the sole, mode of relief in the early days of a declared deposit in the lung with irritative fever.

Local depletion.

The common case of a florid hæmoptysis, with high pulse, a daily febrile access and sweating, where dulness and feeble respiration, with prolonged expiration, are ascertained to exist at one apex, ought to be actively treated by local depletion, followed by counter-irritation. A few leeches, followed by the cupping glass over the seat of dulness, saline medicines, perfect repose, and a non-stimulant diet, offer the best chances of ensuring quiescence of the deposit which has already taken place. At this period it is vain to put in practice the system of feeding the blood which we have advocated in the premonitory stage. Our question is whether this local irritant shall proceed to destructive changes necessarily involving the lung, or be tranquillised into the condition of a foreign body tolerated in a vital structure. On this depend our hopes of chronicity, and the chances of absorption. Absorptive processes do not occur so long as local irritation remains. The changes for which we look in the most hopeful condition of deposited tubercle only take place when pulmonary irritation or inflammation has ceased. Cod-liver oil and iron, with tonics, cannot control or immediately alter the deposit, nor prevent its remaining as a mechanical irritant. Neither can the stimulant and supporting treatment so commonly applied to every affection involving exhaustion of vital powers, be here available, or indeed be regarded as other than mischievous.

Treatment.

Absorption inconsistent with local irritation.

Regarding acute phthisis as the typical form of in-

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Oil and tonics not to be used till the lung irritation subsides.

cipient deposit in the lung, it may be truly said that in no instance have cod-liver oil and stimulant tonics proved of service. Their use is great when the local irritation has subsided, and the constitutional exhaustion remains as the leading condition to amend. The great error of the present day is to regard the former at least of these powerful remedies as a specific applicable to every stage, as striking at the root of the disease; whereas all our experience goes to favour the view that the beneficial results which may fairly be traced to its use are referable to its action as a feeder of the blood, and its local effect in rendering an unorganised deposit more amenable to the vital processes which influence its favourable transformation or removal.

When the local irritation has subsided, and the febrile symptoms lessen, the pulse sinking to a natural standard, and the digestive system becomes improved, as evidenced by a cleaning of the tongue, oil may be commenced with the best effects. Its use is perhaps best preceded by the lighter tonics, to which an alkali may with advantage be added. This is better than administering at once the preparations of iron. The common mistake is to proceed to the exhibition of restoratives while an amount of irritative disturbance is going on which interferes with the normal nutrition of the body and with the assimilation of the constituents which we desire should obtain an entrance into the blood.

The first pause.

At this period, when the first pause has been reached in the onset of the disease by the subsidence of local irritation, we find our patient somewhat emaciated, and the blood partially drained of some of its vital constituents, the tissues flabby and scantily nourished, owing to insufficient vital changes, whilst organic life is invaded, as it were, only at one point. The respiratory organ is crippled but not disabled, and if we were to measure the mischief inflicted by the amount of the mechanical result, we shall find that vital capacity has

been diminished only by a hundredth part of its volume. We have abundant evidence that life can be well sustained with much less breathing-space. It is, therefore, not to this that the threatened danger is due. Could we for a time stop the movements and suspend the peculiar functions of the lung which is the seat of the deposit—could we treat it as we do an external part of the body, by rest and remedies which relieve local congestion,—we should find little difficulty in reducing tubercle in the lung to the inert condition of a gouty deposit in the joints. The peculiar vital endowments of the lungs which prevent this isolation and repose, and the constitutional disorder which has led to the deposit, have, therefore, to be mainly considered in directing the treatment of the first stage of phthisis.

After such local irritation has subsided, we generally find that the system is in a condition to take up nutritive matter very actively. We often witness at this stage a rapid increase in sanguification; the patient regains weight and colour, the secretions become moderate, and an average of healthy function is attained much beyond that which has prevailed for many months. It is remarkable with what ease the blood may be fed, and all the natural indications are for abundant nourishment, and such assistance as we can afford by oil, iron, and tonics.

We cannot speak too highly of the adjuvants of open air, full exercise, mental employment short of fatigue, the cold sponge-bath, and an abundance of the more nutritive articles of food. By following this method, and by the use of prolonged counter-irritation, we have seen cases of the most threatening appearance become chronic, and in some instances the physical evidence of local disease disappear.

It may, perhaps, be said, that it is aiming too low to make our object the induction of a prolonged first stage. But when we remember the few cases in which

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a perfect cure is manifested, and that the conditions which promote toleration and chronicity, and retard softening of the deposit, are identical with those most favourable to its absorption, we shall be better satisfied with the position which we decide on assuming. The physician should always attempt the highest; but his experience and his knowledge should preserve him from supposing that this is the only result to which his art may be directed.

Treatment of the Stage of Softening.

Treatment to lessen congestion.

In so far as remedies reduce pulmonary congestion and inflammatory action, we can control by treatment the changes which constitute the second stage of phthisis. The process of softening seems almost incapable of being originated without increased afflux of blood to the neighbouring tissues. As is well known, tubercle may soften either from its centre or periphery; and the latter would seem to be the most frequent mode. The symptoms accompanying the change are, irritative fever, evidenced by sharp pulse, chills, sweats, &c. The local condition is indicated by much dulness of the percussion note, moist sounds replacing those characteristic of the first stage, and which are probably due to capillary congestion, infiltrations of the ultimate cells, and bronchial râles in the more minute tubes, rather than to changes in the tubercle itself.

These latter, indeed, cannot at this stage afford such intense crepitant sounds as we generally hear. A hæmoptysis frequently marks the pulmonary congestion.

These moist sounds are capable of undergoing changes, and may not only be materially lessened by local depletions, cupping, and counter-irritation, but may pass into dry crackling sounds, the latter being very valuable indications of improvement.

The treatment when softening commences must, therefore, be directed to the lessening of local con-

gestion. A few leeches, and the subsequent application of a cupping-glass, followed by a small blister or a strong solution of iodine, will be found most useful. An open blister may be maintained with great advantage for some weeks.

The length of time during which the second stage may be prolonged is especially worthy of note, and for the whole of the period the sounds remain crepitant. We have pointed attention to this in the chapter on the second stage. It proves that where inflammatory action can be held in check, the coalescence of softened masses of tubercle, so as to form cavities of an appreciable size, may be prevented. It is in this stage that counter-irritation is especially useful.

When the constitutional symptoms subside, all the methods of improving general health should be adopted, as change of air, tonics of the more active kind, cod oil, and a highly nutritive diet.

Oil and iron inadmissible when fever exists.

During the persistence of active febrile symptoms, such remedies as oil and iron are inadmissible. With a hard and rapid pulse, much heat of surface, and hectic perspirations, these preparations invariably do harm; and it is owing to their indiscriminate adoption at this period, that in some hands they have fallen into disrepute. It is when the pulse has subsided, the daily access of chill or flush has disappeared, and the physical signs indicate a pause in the advance of the local disease, and especially when the crepitant sounds are becoming more dry, that these feeders of the blood are of value.

During the prevalence of hectic, which especially accompanies this stage, cooling remedies are most appropriate. The carbonates of ammonia or of potash in effervescence are best borne. A liberal allowance of cooling drinks, with lemon-juice or tamarind, gives great relief. The diet should consist chiefly of milk, fruits if in season (the grape, and our English strawberries and gooseberries), light soups, fish, and the

Diet.

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lighter puddings with eggs. Meat is generally little desired by the patient, and its use should not be insisted on. Stimulants of the stronger kind should not be given. If the patient have been accustomed to wine, claret or hock is most suitable. The use of milk with Seltzer water is very grateful.

Remedies for perspirations.

To check the excessive sweatings, various remedies have been resorted to. Of these, the best in our practice have proved to be the gallic acid and the oxyde of zinc—the first more active. The sulphuric acid, with or without quinine, is also beneficial occasionally. In certain instances, where the daily hectic chill was unusually severe and amounted to a rigor, we have used quinine in full doses (gr. iij. to gr. v., ℥tiis horis) with advantage. In these instances, the access came with the regularity and severity which we have only witnessed in quotidian ague. It often differs from the latter in having no sweating, the heat of surface being intense and persistent for hours, but not relieved, as in the terminal stage of the marsh fever, by copious perspiration. The patient suffers intensely, and feels 'burnt up.' The greatest relief is experienced from daily sponging with pure vinegar, which is best done after the early morning perspiration, and should be followed by a change of under-clothing; and, if able, the patient should rise from bed.

Finally, it is never to be forgotten that the hectic is generally a measure of the irritation of the lung. Frequent counter-irritation cannot be too highly recommended with a view to its diminution. The open blister, the croton liniment, the strong* solution of iodine, and the tartar emetic ointment, will all be found very serviceable. We have not found them reduce vital power, while they eminently assist in lessening the irritative cough and the sweating. Of these, perhaps

Blisters. Iodine.

* ℞ Iodinii ℥ij. Potassii Iodidi ℥iv. Sp. Vini rectif. ℥j. Solve. To be applied with a glass brush.

the iodine solution is the best; but it cannot be pretended that by its external use any specific action on the system is obtainable.

Dyspnœa.

The dyspnœa which is a very common symptom in this stage, is also best relieved in this manner. It would seem to be due rather to congestion of the pulmonary tissue than to the amount of tubercle deposited, for it is very capable of a certain amount of relief by external irritant applications.

Another cause for dyspnœa of the spasmodic kind is occasionally present in emphysema of the lung. This is best treated by such remedies as lobelia and sulphuric ether, while in certain cases we have seen excellent results from the iodide of potassium.

Cough, treatment of.

Cough is such an invariable concomitant of the second stage of consumption, that by its relief we not only alleviate the distress of the patient, but by adding to his hours of sleep, his vigour and nervous tone are greatly improved.

In prescribing for this symptom, the following points should be remembered:—

Dry.

1. Where the cough is dry, frequent, and irritating, its seat is often found in the pharynx and fauces, and local remedies may give greatest relief. Of these, the gargle of tannin (ʒss. to ℥viij.) and the solution of nitrate of silver (gr. ss. to ℥j.) are the best astringents, being generally more suitable than local demulcents.

Counter-irritation.

2. Where cough is due to active irritation in the lung, counter-irritation or local depletion is the best remedy. A small blister, followed by the endermic introduction of morphia, will often relieve most effectually.

On expectoration.

3. The cough for purposes of expectoration, when the latter is not excessive, and characteristic of a bronchial origin, should not be suppressed by remedies.

Bronchial.

Where bronchitic irritation is manifest, the secretion being frothy and difficult, and the patient has a sense

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of tightness across the chest, with dyspnœa, the best remedies are counter-irritation and small doses of tartrate of antimony with alkalies.

Sedatives best for cough of phthisis.

4. The purely phthisical cough is best treated by sedatives, and these are better given without any combination with expectorants. Neither from theory nor practice have we any indications for expectorant medicines in ordinary phthisis. The cough is due either to pulmonary or reflex irritation, or to the necessity for getting rid of secretion. For the latter variety no remedy is necessary.

Cough from irritation is often due to reflex action; and gastric disorder is a frequent cause in some instances, an ulcer being present in the stomach. In such circumstances food is almost sure to induce a fit, and sometimes the stomach is emptied by the same act.

Again, the constant repetition of harassing cough of a nearly dry character, which is so distressing to the patient and his friends, seems caused by an altered innervation of the larynx. In both these instances we have found, after submitting many hundreds of cases to various remedies, that pure sedatives gave most relief.

Morphia.

Morphia,* from the twelfth to one-sixth of a grain, dissolved in a little syrup, is the very best of these; or morphia with hydrocyanic acid, or laurel water.

A small blister, followed by the endermic application of morphia over the larynx, often gives much relief.

The inhalation of narcotics (as Ext. Conii gr. xv., Ext. Lupuli gr. xx.) has been found very useful.

The tincture of cannabis, the tincture of aconite, and

* Many thousands have used the following preparations:—

℞ Morphiæ Hydrochloratis gr. iij. Sp. Pulegii ʒss. Syrupi Limonum ʒijss. M. Ft. Syrupus. *One teaspoonful for a dose.*

℞ Mucilaginis Acaciæ ʒ v. Morphiæ Hydrochloratis gr. j. Acidi Hydrocyanici diluti (P. L.) ♏ xviij. Syrupi Limonum ʒj. M. Ft. Mist. *One tablespoonful for a dose.*

the preparation called chlorodyne, whose proportions combine those of cannabis and of morphia, are also useful. The chloric æther seems less valuable than the pure sedatives, but suits many cases.

Brandy.

The cough which causes vomiting is often best relieved by a small quantity of strong brandy-and-water. It is also occasionally mechanical, caused by distention of the stomach, oppressing the diaphragm. In such instance directions should be given to take a limited quantity of food, and not to drink much fluid at meal-times.

Demulcents.

Remedies of the demulcent kind often give great relief. Of these the decoction of cetraria or of the Irish moss (so-called) have proved most useful. The former especially, combined with laurel water, will relieve many patients who cannot take morphia or opium in any form.

In all cases the tendency of sedatives to disorder the stomach, by stopping the secretions, and to cause secondary nausea and headache, is to be remembered, and a night's rest is not to be purchased at this cost to the general health. When the patient is liable to be thus affected by opium, the best antidote is lemon-juice, or a small cup of strong coffee taken on waking. The combination of camphor or of ipecacuanha with opium is also well known to counteract the disagreeable secondary effects of the latter.

Tonics, when not suitable.

Tonics are not so suitable in this stage of phthisis, when symptoms of active irritation are commonly present, as in the other more quiescent periods of the disease. They are more applicable in the limited and local use, for the purpose of rallying a flagging appetite, than when given with the intention of invigorating the general health. Very minute doses of strychnia often answer the purpose admirably. We have found a simple infusion of gentian, made of twice the usual strength, most useful. Iron is not a good 'appetiser;' but the calumba with which it is often combined will by itself

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answer the purpose. As a rule, the simple vegetable bitters combined with an aromatic are better than the mineral tonics, when the tone of the stomach has to be reinforced.

Treatment of the Third Stage.

Cavity.

When cavity has formed in the lung, if it be of the circumscribed and defined form, the other portions of the lung remaining comparatively free from tubercular deposit, there is commonly a cessation of the febrile symptoms and of the constitutional disorder, and the patient has an opportunity of recovering flesh and vigour, which should be taken advantage of for the administration of the more active tonics and of cod-liver oil. We have already considered this condition in the chapter on chronic third stage, and have only to repeat that all the indications are for a highly nutritious diet, and a fair allowance of stimulants suited to the age and sex of the patient. During the formation of a cavity of this kind, when the prostration was so great that life was threatened, we have in many instances had to give unusual amounts of stimulants, and have seen the most marked success follow their liberal use. Reference is now made only to the circumscribed cavity; for if tubercular mischief be extending, this mode of treatment can only do mischief. But, under the conditions described, the patient should live on the highest kind of nourishment, and take plenty of wine, egg, milk, turtle, and meat.

Stimulants.

Counter-irritation.

It is in this case that counter-irritation is of such marked use; and the best of all modes is the seton. When the cavity has been fully formed and remains stationary in its limits, as evidenced by the physical signs beneath it, and when flattening of the chest-walls is beginning to take place, a seton should be placed over the spot. If this be objected to, an issue or perpetual blister is to be maintained. We

have very many cases on record which show the utility of this mode of treatment, and must offer our testimony in its favour in addition to that of many observers. One of these (Stokes) we may quote :—'The patient's best chance I believe to be the use of the seton and travelling.' A small continuous drain, if it does not weaken the patient, may thus be maintained for years; and many of the longest cases which we have witnessed have been so treated. The strong solution of iodine may also be used with great advantage, and should be painted on the affected side about once in ten days.

The tendency of such cavities as these is to contract; their walls become lined with a species of membrane when the tuberculous mass has been softened and removed; and in course of time the excavation is greatly reduced in volume—a result which is partly due to new fibrous tissue deposited around it, to the depression of the chest-walls from atmospheric pressure, and possibly to dilatation of the surrounding healthy air-cells of the lung. Active exercise in the open air, and gradually increased efforts to expand the lung by such exercises as riding, reading aloud, and occasional forced expansion, when the case has become quite chronic, are the natural modes by which we may assist the curative process. The irregular cavity, which is in fact only a breaking-down of more or less of the infiltrated pulmonary tissue, generally involves such an extent of the remaining part of the lung, that continuity of the diseased process is almost certain. The third stage of phthisis, when attained in this manner, implies disintegration of large and irregular masses of tubercle, with all their intervening structures.

CHAPTER XXVIII.

CLIMATE.

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Climate.

THE following are submitted as indispensable considerations in selecting cases for removal to a different climate :—

First,—As regards the local disease.

Change of air cannot cure.

It is impossible to cure tubercular disease of the lung by any change of air. It would seem almost unnecessary to enlarge on the subject, were it not that the public, and occasionally an over-credulous practitioner, still cling to the idea. The disorder is not local, has not been caused by irritation of the lung or air-passages, and is not susceptible of cure by merely local remedies. Therefore, warm air, dry air, or any modification of atmospheric influences, can only act by lessening the complication of irritation of the bronchial membrane, which forms a single feature of the disease. If we had to deal with a single ulcer in the pulmonary tissue, we might expect much from constantly keeping the patient in a mild atmosphere ; but we have to deal with a tubercular ulcer and a tubercular state of the system, which is a very different thing. The ulcer in the lung is composed of tubercle in the stage of softening, congested pulmonary tissue, the remains of old inflammatory thickening, an altered mucous membrane, and in almost all cases a thickened pleura. To all of these, excepting the last, the entering air is applied. It is true that this necessity of enduring a constantly renewed contact

The disease not local.

with the atmosphere is productive of irritation in the lung; but this condition is an unavoidable necessity of the circumstances of the organ which is engaged in the diseased action. In a carefully regulated temperature, if this were the only condition requisite, we should find the process of softening retarded, and the ulcer assume a chronic form.

Softening not retarded by temperature.

But, with the largest opportunities for observing this condition, in a hospital with a regulated mean of 63° in every apartment inhabited by the patient, day and night, we do not find softening of tubercle or spreading destruction of the lung arrested or controlled. The causes which influence this process are evidently those which arise from within, and do not depend on conditions external to the system. In ninety-nine cases out of the hundred, the disintegration of an old deposit is coincident with a fresh deposition of tubercle in the lung, which may be viewed as identical with a renewal of the constitutional affection. After much experience, we can declare that in the cases in which softening commences while the patient is within the hospital, it does not appear to arise in any degree from exposure to atmospheric influences. If even temperature, shelter from cold and damp, and a constantly renewed air could prevent softening, here we have the experiment tried on the largest scale. And what are the results? A certain number of our cases, with the best care, undergo this destructive change. The symptoms with which this is ushered in and accompanied, when active, are so manifestly constitutional, that we are forbidden to refer them simply to the local irritation caused by atmospheric influences. When passive, they would occur, as we know, in any climate. Again, it is notorious that cases of softening tubercle with febrile symptoms invariably do badly in the 'mild air' to which it is the fashion to export consumptive cases. In some of the most frequented foreign residences, we have witnessed many instances of

Hospital experience.

Mild air unfavourable in the stage of softening.

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this stage being accelerated by the very atmospheric conditions which had been sought for its retardation! We appeal to the experience of the physicians of Madeira, Pau, and Rome, whether this is not true. We maintain, therefore, that it remains to be proved that mild air can retard destructive changes in tubercle. It is true that the bronchial complications which so often distress the patient may frequently be avoided by such removal; but are these in general the forerunners of tubercular softening? They are the inevitable concomitants; but we must deny that, excepting in rare instances, they are the pathological phenomena which induce such changes. It is true also, that if congestion of the lung be induced by cold air and exposure in a case where tubercle has remained quiescent in the lung, the latter may be called from latency into activity; but in practice this cause is quite exceptional, and, while it is to be sedulously avoided, can never be regarded as one of those which should occupy a foremost place in the prudent calculations and preventive measures to be adopted by a careful practitioner.

Good effects of change of air due to purity and dryness.

Bad effects of relaxing air.

The effects of change of air on the local disease are often remedial; but this is due rather to the qualities of purity and dryness, than to high temperature. This is a fact evident from experience. The relaxing climates, where the air is loaded with moisture, and often with malarious impurities (as in Rome), tend to promote secretion from the bronchial membrane, and to diminish its tone, and that of the elasticity of the contractile tissue of the air-cells. The object proposed by the older physicians, and by many even at the present day, was to maintain the respiratory actions of the consumptive patient at the lowest possible average, and to present such a quality of air as by its warmth and moisture should be easily breathed, but should excite the vital interchanges between the atmosphere and the blood as little as possible. The pathological views

which prompted this advice were based on the hopeless character of the affection, on the impossibility of so invigorating vital processes and the pulmonary apparatus itself, that the progress of disease should be arrested; and on the kindly necessity of rendering the remaining hours of life as easy as possible. Arguing from the point of view that all cough is the result of bronchial irritation, and all bronchial irritation is the result of cold air, it was proposed to lessen this symptom of the disease, which was often taken for the malady itself, by immuring the patient in hot rooms at home, or by sending him to a tropical climate abroad. The results are well known. The patient at home died rapidly from respiring the impure and relaxing air of heated apartments, by which the destructive changes in the lung were encouraged, and his nutrition was impaired; while the exported victims of a theory, after experiencing a temporary relief, speedily declined and perished. Such extreme experiments are now seldom tried, but we still find it proposed to send patients in the stage of irritative softening to Madeira, or some analogous climate, with a view to relieve local irritation by the inhalation of mild air. How little success attends this removal the practitioners of Madeira are well aware, for no winter passes in which many deaths do not occur among patients sent out in this stage.

Dry, cool air relieves most. Why?

We go a step farther, and maintain that a warm, relaxing air is not that most adapted to relieve local irritation of the lung in consumptive cases, and that a pure, dry air of moderate temperature is most agreeable to the patient, and productive of the greatest amount of relief.* This is a question both of theory and experiment. The results harmonise with both. An individual with a portion of lung rendered inactive

* For the author's experience on this subject, after a residence of seven years in Italy, see *The Climate of Italy with reference to the Treatment of Chronic Disease*—a series of papers in the *Medical Gazette*, 1850-51.

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by disease should surely have the remainder of the pulmonary membrane supplied with an atmosphere as perfectly adapted to the purposes of respiration as it is possible to obtain. The system is thus most fully supplied with oxygen, and the vesicular structures of the lung are retained in their integrity. Respiration should be maintained at the highest possible average, and not at the lowest.

The expansion of the air-cells by active respiratory movements, and a full aërification of the remotest parts of the bronchial tree, are antagonistic both to the collapse of the cells which is likely to take place in tubercle, and to the further blood contamination which may occur from any impediment to breathing. These principles are well established by competent observers, and are gaining ground day by day among the Profession.

Experience of use of dry, cool air.

By experiment also it will be found that the greatest possible amount of relief to a patient suffering from tubercle in the lung is obtainable by free exposure (with the surface well protected) to a dry, pure, and still, open air, even when of a low temperature. We have tried this in very many instances, and are in the habit of sending out the in-patients at the hospital to breathe fresh air even in winter. Of course, exposure to east winds, and the combination of wet and cold in the air, is to be avoided. It is invariably found that these patients do not cough when in the open air, even although they have just left a carefully maintained temperature of 63°. We have sent patients to winter in the dry, pure, still air of Canada with the greatest advantage. Cough and bronchial irritation have not been increased, while the nutrition of the body has been stimulated and improved. The air of Mentone owes much of its character to this purity, and not to warmth. Shelter from currents has often been con-

founded with warmth, but has not the same meaning. A larger quantity of heat and of vapour exhaled from the pulmonary membrane is carried off by exposure to a current of air; but still, cold air in a sheltered place produces less of this effect. Heat which rarefies the atmosphere, and is not incompatible with much contained moisture, tends to relax the pulmonary membrane, and impede respiratory changes, as less oxygen is afforded at each inspiration. By exercise in a cool, wintry air, more carbonic acid is carried off than in summer. We shall presently show to what are due the good effects of some of these climates so greatly praised; but must contend that they have no direct influence on the local disease of the lung, by virtue of any so-called sedative action.

Irritative fever forbids removal.

In no instance should a patient be sent abroad while labouring under irritative fever. This hectic condition may attend on any stage of the disease. If it be present in the first, we know that the constitutional disorder is still proceeding, and that the local disease will persist in spite of any removal. If it accompany the second stage, it is the index and measure of destructive changes in the lung as well as in the tubercle, and the patient will get worse if removed. None of the remedial influences observed from a well-selected climate are attainable in such a case. The discomforts of travelling and the very fact of removal are prejudicial; and while the patient loses health, the climate and the medical adviser lose credit. Should hectic be present in the stage of cavity, we know that, for the time at least, the system is not tolerating the cavity, but that breaking-up of the lung tissue is continuing, or a fresh deposit is taking place in some other part of the lung. Such symptoms may subside, but we should await their subsidence before advising removal. Finally, as a definite rule, in no case should a patient

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be sent away for change of air with sustained acceleration of pulse.

In considering the cases most likely to be benefited by removal to a foreign climate, we are therefore to be guided by the following conditions:—

1. The deposit in the lung having taken place, all activity of disease should have ceased; and the physical evidence should prove the absence of its progressive extension, or of irritation of the tissue of the lung.

2. The absence of febrile action is an imperative condition. If there be any daily access of chills, heats, or sweating, with high pulse, the patient should not travel.

3. The digestive system should be fairly healthy, or at least the symptoms of gastric distress, thirst, nausea, furred tongue, or diarrhœa, should not be habitually present. If these precautions are observed, the patient may often travel with advantage, even although much emaciated.

The moral effects of change, and the difference in the quality and freshness of the respired air, especially after confinement to the house, are often felt to be powerfully remedial; and the languor, mental and bodily, the want of appetite, and restlessness which prevent sleep, are frequently relieved within a few days of the removal of the patient. Best of all is a long

Sea voyage.

sea voyage. The daily passage through fresh air, ensuring its constant change without fatigue; the stimulation of appetite which soon occurs; the rest of body, without complete inactivity; the novel events of a sea life; the absence of the noise and impurity of atmosphere of the city left behind; the tranquillising effect of a daily contemplation of the grand phenomena of nature, of the vast ocean, the sunset, and the starry heavens, invigorate and restore the patient day by day.

Boating life.

Next in value we would place a voyage up the Nile, should the season admit of it. The boating life, especially if a select circle of friends can be ensured on

board, with reading, music, sketching, and daily change of scene; the tranquil, dry air; the beautiful nights; and (for men) the power of making excursions, shooting, &c.: all these form most eligible surroundings for an invalid just escaped from the sick-room.

Should the patient's health permit of it, the life in the desert, as on a journey from Suez to Jerusalem, is very suitable. The extreme purity and dryness of the air, and the constant exposure to sunlight and the atmosphere, if exercise be not pushed to fatigue, have been found to agree well with many persons whose lives would have been shortened had they remained in cities. Should these more remote journeys be unattainable, shorter and more accessible summer travel is within the reach of many. Such places as the Pyrenees, parts of Switzerland and the Tyrol, offer resorts where gentle exercise on horseback in the purest air may be daily carried out. We have often been pleased with the evident respiratory relief which we have witnessed in consumptive patients on attaining the upper levels in the Pyrenees and Alps. The highest regions should, however, be avoided, as the liability to chill after ascending great elevations on a sunny day is very great, and fraught with danger to the invalid.

River excursions are almost given up in these days of railways; but nothing is more delightful than the survey of such scenery as the Seine, the Loire, the Rhone, in France, or the Rhine and Danube, afford. Open-air life without fatigue is thus ensured; and where the more enterprising excursions are forbidden, this quiet method of passing through rich countries has many advantages.

Winter climate.

The winter climate to be selected is, however, the most important question for the invalid, where a long sea-voyage is not practicable.

Acting on the views here and elsewhere put forward, we have for many years ceased to make warmth the

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condition of climate to be recommended. The absolute winter of England is not so unsuitable to the consumptive invalid as has been supposed. The spring is the time of danger; and it is with a view to avoid the drying east winds of that season that a removal from this island is advisable.

For the winter months (December, January, February) a well-placed residence in many parts of England, north and south, will answer perfectly.

What we desire to obtain is shelter from wind, a dry soil, with good drainage (and therefore the absence of fog), and a southern or south-western exposition, with the facility for being out of doors every day. Many parts of the South of England meet these requirements; and we need scarcely enumerate Ventnor, Torquay, Hastings, and Queenstown in Ireland, which we are inclined to recommend in the order here given.

Relaxing air.

Air of too relaxing a character is found on experience to depress appetite and nervous power. Many invalids are obliged to leave the places above named, and get on better in more elevated situations where the air is bracing. For such we have known Malvern agree remarkably well. Tunbridge Wells is very suitable for a class of patients who do not bear sea-air.

Jersey is a favourite residence with many who cannot bear excessive cold, and deserves to be classed with the eligible places of easy access for all.

After the remarkable details which have been furnished by several competent observers about the Hebrides and part of the North of Scotland, proving the infrequency of phthisis among the natives, we know not why patients should not be recommended to reside there. The want of accommodation alone should prevent this.

Shelter from East Winds in Spring.

East winds.

This is exceedingly desirable for the consumptive

invalid, because the intercurrent attacks of pneumonia and bronchitis are thereby avoided. We have no evidence that the tubercular disease is capable of being increased by exposure to cold, but we are well aware how great is the hazard of inflammatory accidental attacks.

The absence of east wind is not attainable anywhere in Europe north of the Alps and Pyrenees. Shelter is to be had in England and elsewhere; but the east wind blows above and around the protected locality, and its influence is felt by the fireside, and even in bed. With this fact we are all familiar, but we are in the habit of confounding shelter with the absence of wind. The former may be had at many places of resort in England; for the latter we must go far.

The South of Spain and the South of Italy are the two European climates most free from east wind. At Cannes, Nice, Mentone, and all along the Riviera, the wind is 'bise,' or north-west, and similar in effects to that from the east, its stimulant, irritative qualities being well known. Shelter can be obtained along the coast, but not a perfectly uniform climate. The absence of easterly influences seems to be first felt about Pisa and at Rome: the only severe wind is the 'tramontane,' or that which blows from the north. It is stimulating and drying, but has not the peculiar effects which we attribute to east wind, such as excessive dryness of skin, frontal distress, and general malaise. Neither does the digestive system suffer while it is prevalent, but active exercise in the open air readily restores the functions of the skin.

In Madeira, at Algiers, and in Egypt, we can also, as is well known, obtain this desired absence of easterly influence. It remains, however, to be stated that, having found shelter at home or a locality abroad in which east winds do not prevail, we may find other

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conditions and new influences capable of exercising even more injurious effects on our patient.

Bad effects of certain climates on digestion.

The depressing effects of various climates have been much overlooked. Excessive heat, or warm relaxing air; the prevalence of soft winds from the south and west, as the 'scirocco' at Rome, and the general sedative influence of the calm mild climate of Madeira, and even of Pau, are well known to depress nervous power, and directly tend to disorder the digestion, producing loss of appetite, furred tongue, and constipation, the latter probably from inactivity of the liver. At Madeira especially the prejudicial effects of these symptoms are well known to both patients and medical men, and it need scarcely be said how much vital power is depressed in the consumptive by whatever interferes with appetite and lessens the quantity of food which the patient can consume and assimilate.

Relaxing effects.

A prolonged residence in Rome, where the malarious element is present in the atmosphere, afforded ample evidence of this fact. The healthy English who pass a winter there are much troubled by loss of appetite and constipation, with various symptoms of hepatic disorder; and in invalids the digestive and nervous systems are frequently disordered. Headache and lassitude interfere with the enjoyment of fresh air and exercise, which is so desirable.

We have lost many patients at Madeira, whose health failed to improve owing to this cause. The complication of phthisis with irritable gastric dyspepsia is found to be aggravated by a warm, relaxing climate; and such individuals should be advised to seek rather the bracing, dry localities to be found at home. Above all, in summer they should leave the relaxing climate in which they have passed the winter. Fortunately, such changes are readily attainable. Those who have wintered at Rome or Pisa should go to Switzerland;

while a summer visit to England will be found of great advantage after a winter at Madeira.

Finally, it is by the adoption of such changes of residence as, after a careful study of the individual peculiarities of each case, seem likely to improve the general health, to increase nervous tone, and to invigorate digestion and sanguification, that the real advantages obtainable from climates may be made available for phthisical patients. The idea of specific climatic influence as curative of consumption is to be abandoned, all individual peculiarities in each case are to be studied, and, by the indications so gathered, our advice is to be guided.

The conditions influencing nutrition, and especially the purely digestive processes, are to be considered as of primary importance; the localities requisite to ensure open-air exercise, with light and purity of atmosphere, are to be especially recommended. Damp and low situations, and miasmata from animal or vegetable impurity, are to be shunned. A tonic and bracing air is preferable to a relaxing, damp, and warm atmosphere. Extreme ranges of temperature, as likely to cause congestion of the bronchial membrane and of the lung, are to be avoided, but a uniformly high average is not advisable in the residence to be selected. Nor is a persistent sojourn in any one climate or locality to be recommended.

The effects of mere change of air on the pulmonary membrane and on the nervous system are to be remembered; and the patient who has passed one winter in Madeira or Algiers is more likely to benefit by a return to these localities if the intervening summer has been passed in a cool or temperate climate, like England or Switzerland.

It is never to be forgotten that the most hardy, vigorous, and long-lived races in the world, the civilisers who can tolerate the greatest extremes of new

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climates, and who have colonised the remotest countries with the moral, mental, and physical constitution best fitted to work and to endure, come from these islands, and have been nursed in a temperate climate. The races which have decayed or died out, whose mission in the world appears to have been only temporary, and who did not, therefore, possess the elements of long endurance, were inhabitants of the relaxing climates around the Mediterranean or of the far East. The existing differences between the races of the North and South are equally illustrative of the influences which tend to vigour. Let the traveller contrast the inhabitants of Germany, France, or England, with those of Spain, Portugal, or Southern Italy, and the vast difference in energy of character and in accomplished work will be apparent. Or let us take the colonies of these countries, and compare the vitality and vigour of the United States or of Canada with the exhausted energies of the South American Republics.

It may be replied, that the institutions and the religion of these various countries have much to say to their present condition; and this is true. But national character and physical vigour are the primary elements out of which institutions are formed, and which originated their power or their weakness. And with all history before us, including that of the Roman Empire, which, as it became intermixed with the Eastern element, crumbled away before the energy of the North, we cannot avoid the conclusion that climate has, among the many influences apparent, a place among the more important agents which give a stamp to the character and elaborate the vigour of nations.

And to apply this line of thought to the practical questions daily before the physician, we cannot believe that a disease of lowered nutrition, with consequent exhaustion of vital powers, is best treated in all instances

by a residence in climates of the enervating and relaxing character; while, on the other hand, we have abundant evidence that all which is tonic and invigorating in external influences is productive of corresponding good in the vital system, provided that individual constitutions and requirements are carefully studied.

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