Clinical lectures on pulmonary tuberculosis.

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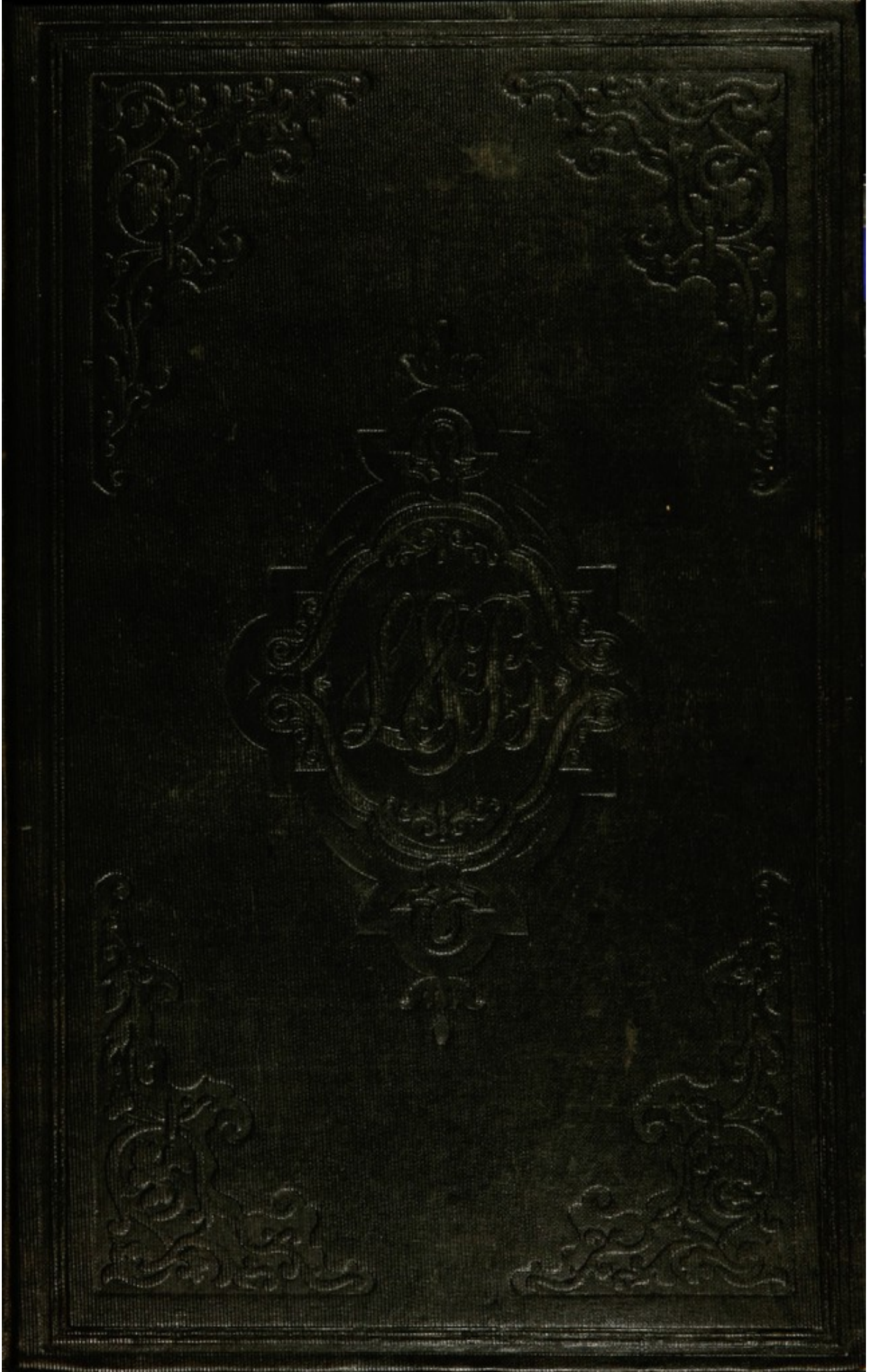

B. F. Harris.

B. F. Harrison

Wallingford,

CLINICAL LECTURES

ON

PULMONARY CONSUMPTION.

Plate. I.

Fig 1

Fig 2

T. Sinclair's Lith. Phil.

Plate 2

CLINICAL LECTURES

ON

PULMONARY CONSUMPTION.

BY

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PHILADELPHIA:
LINDSAY AND BLAKISTON,
1854.

PREFACE.

THESE Lectures were originally delivered at the Brompton Hospital for Consumption during the Spring of 1851, and were published with slight alterations in the second volume of "the Lancet" for that year. The favourable reception which they obtained exceeded my anticipations: and, at the recommendation of some of my professional brethren, whose judgment I highly esteem, they are now incorporated in a volume, with such modifications as further reflection has suggested. Clinical lectures afford an advantageous medium for communicating medical information. The short but faithful sketches of individual instances of disease, thus presented, are more readily available than detailed and elaborate descriptions; and better adapted to instruct the student respecting the proportionate value of different symptoms. Whilst avoiding tediousness, it has been my constant aim to impress the points of chief importance; and it is doubtless practicable to be

brief without being superficial, although simplicity is more difficult than complexity.

The facts recorded were not chosen in order to support previous theories; on the contrary, the first step in the preparation of each lecture was to collect and tabulate all the facts which the wards might happen to supply for the illustration of the particular topic under consideration; and the comments were usually such as seemed to spring naturally from the examples presented.

The subject of a lecture was sometimes determined by the incidental presence in the hospital of numerous or remarkable instances, illustrative of some particular truth. This circumstance may occasionally, as for example, in reference to the gingival margin, and the influence of posture on the pulse, have given a more than ordinary preponderance of statistical evidence in one direction; but will not be found to have led to any conclusions which are not essentially in harmony with ordinary experience.

Further observation, since the Lectures were delivered, has for the most part strengthened my conviction respecting the accuracy of the opinions which they convey, with one important exception, having reference to the asserted inefficiency of vegetable oils; since it will be noticed* that I have been induced, in con-

* See Lecture VI., p. 128.

sequence of my experiments with cocoa-nut oil, to qualify that assertion.

In the present day a large proportion of talent and ingenuity is devoted to minute researches, doubtless of great interest, but which it will probably be reserved for another generation to mature and apply. It has been my aim to abstain from any elaborate discussion of such topics; and to present, as simply as possible, what has appeared to me most important in the way of direct and practical utility. If I have sometimes appeared to wander in search of collateral illustrations, it has been from a strong impression that, while the lights of modern science may correct the less perfect representations given us by former masters of our art, they should not be allowed to dazzle us into a disregard of their sound observations. The current of medical science may be made to run deeper and clearer, when the springs of literature are brought in to swell its streams.

In the style and composition of this volume, I am conscious of many defects, some resulting from its colloquial character, others not susceptible of the same excuse; but, were I to wait till my own mind is satisfied, the Lectures would probably never be published. Impressed therefore with the truth, so well expressed by the French adage, "Le mieux est l'ennemi du bien," I venture to reproduce them, although still disfigured with many imperfections.

It is a satisfaction to collect materials for rectifying opinion, and to offer suggestions for advancing truth; and it may therefore be hoped that the facts here recorded will be confirmed by other observers, and retain a permanent value. Any observations which may be novel, I shall be interested in comparing with those of others engaged in the same noble profession, and anxious, according to their opportunity to contribute their share to the advancement of knowledge, and the good of mankind.

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INTRODUCTION.

It will be observed in the course of the following lectures that, while the physical signs associated with pectoral disease, especially as relates to phthisis, are not neglected; yet, as the elucidation of these indications is not the primary object, they are more cursorily noticed than in any modern works relating to such affections. Other manifestations of disease have been more fully discussed; because, although of special importance in their practical relations, they are perhaps, from various causes, too often inadequately appreciated. Some further notice of the phenomena presented by auscultation may here be appropriately introduced; but it would be inexpedient to swell the volume with a systematic and elaborate dissertation, since valuable treatises on the subject are readily accessible. The few introductory remarks now offered are, therefore, chiefly designed to render this branch of science more simple, and more readily comprehensible to the student.

It is gratifying to reflect on the remarkable progress made during the present century in the diagnosis of thoracic disease; a progress which a glance

at standard works published less than thirty years since will render strikingly apparent. It may be sufficient to instance the remarks of Dr. Mason Good, in the second edition of his work on the "Study of Medicine;"* published about the period when Sir John Forbes first called the attention of the profession in this country to the observations of Laennec. The chapter on Dropsy of the Chest, in Dr. Good's work, may be selected as affording material of much interest, viewed in relation to the present mode of investigation. In reference to dropsy of the mediastinum, pleura, pericardium, and lungs, Dr. Good observes: "These can never with any degree of certainty be distinguished from each other till after death;" and "those who are desirous of examining into the curious and often contradictory signs, by which these several forms of pectoral dropsy have been attempted to be discriminated by various writers, may turn with advantage to Sir J. Maclean's work on the subject." He adds,† "The only decisive symptom in this disease is the fluctuation of water in the chest, whenever it can be ascertained; for several of the other signs are often wanting, or, in a separate state, are to be found in other complaints of the chest, as well as in dropsy, more particularly in asthma and empyema."

Every reader of these lectures is probably familiar with the change effected in this department of inquiry, since these remarks of Dr. Good were penned. It must however be acknowledged, that the advantages which the new modes of investigation offer have not always been realized; partly in consequence of a tendency to

*Vol. v. p. 404. † Ibid. p. 407.

regard the phenomena observed by means of auscultation as necessarily obscure and complicated. That such an opinion is founded on misapprehension, will be rendered obvious by a little reflection on the physical causes of the acoustic phenomena to which auscultation is applied.

The soft silky sound, heard on listening to the chest of a healthy individual in the act of breathing, cannot be mistaken. Every practitioner must have had frequent occasion to observe this silky murmur superseded by bubbling sounds; when, in consequence of affections of a catarrhal character, the air in its entrance or its exit passes through the secretions with which the air passages are occupied; the sound being necessarily modified according as this secretion is confined to bronchi of considerable caliber, or diffused through the smaller tubes, or the aërating tissue of the lungs. When the smooth extension of this tissue is prevented by causes extrinsic to the cells, and when the air in expiration does not pass through secreted fluid, the sound produced has not a bubbling character, and may be confined to the period of inspiration. In this way varieties of crackling and crepitation sounds originate. When, in consequence of thickening of the investing membranes, or the presence of any partial obstacle, the caliber of the bronchi is altered, vibratory sounds are induced, which may be grave or acute, according to the diameter of the passage affected.

The simple view thus presented sufficiently represents the principal circumstances which require to be considered in the practical application of auscultation to those diseases of the chest in which difficulties are

most frequently experienced, and errors most readily committed.

It must be acknowledged that for the attainment of familiarity with the practice of auscultation a considerable devotion of time and labour is required; but it will scarcely be disputed that, in addition to the difficulties inherent in the subject, others have arisen: 1st. From attempted refinements, not authorized by existing phenomena. 2d. From the use of terms, either inaccurate, or not sufficiently distinctive. The first of these mistakes tends to render the art of auscultation attainable; the second introduces confusion, which is often worse than ordinary error, because it is a form of error difficult to correct. I do not expect in these introductory remarks altogether to avoid such defects; but it will be my aim to describe such sounds only as can be readily recognised; and to select such terms as shall express as marked a difference as possible, between sounds differing in their character and significancy. Whilst avoiding any unnecessary alteration of terms which have been sanctioned by general usage, I shall not scruple to displace those which are obviously inaccurate, or calculated to induce practical error.

In attempting to form systematic classifications of auscultatory phenomena, confusion has often arisen from the circumstance, that some sounds have been designated according to the impressions made on the ear, and others in subserviency to some theoretical idea regarding their mode of origin. Thus, for example, the crepitant rhonchus, although from its name implying a sound dry in character, is yet placed by some authors among moist rhonchi, on the supposition of its being

due to the presence of secretion. If it be considered expedient to adopt an arrangement founded on the nature of the impression, whether of dryness or of moisture, made on the ear, the crepitant rhonchus should certainly be placed in the first of these divisions; and my own view of its cause would induce me, on theoretical grounds, to consider this its appropriate place. It is difficult by any verbal representation to convey to one man a correct idea of the impressions made on the senses of another; and, in adapting terms to describe impressions on the ear, it is undesirable to introduce those which are expressive of pathological conditions. The remarks of Skoda, that crackling is a *dry* sound, and indicates the presence of *fluid*, probably of a tenacious character, in some of the bronchial tubes, or in a cavity, may serve to illustrate the contradictory character of the language, to which designations involving speculative opinions are apt to lead.

In the attempt now made to simplify the subject I shall not include all the auscultatory sounds, but chiefly those of practical importance; which are most easily confounded in consequence, either of some supposed similarity in their character, or of the ambiguous terms by which they have been described. Percussion sounds, modifications of sound derived from the voice, cardiac, venous and arterial murmurs are omitted; since they are for the most part easily distinguished, and the terms by which they are designated are sufficiently expressive. It is undesirable to give similarity of name, and juxta-position in arrangement, to sounds perfectly distinguishable, and characteristic of diseases altogether different in their nature;

as is often done, for example, with respect to the crepitation of inflamed lungs, and the moist crepitation of consumption. With a view to avoid such inconvenient commingling of ideas, and to facilitate the comprehension of the subject in its practical applications, I would venture to propose, as simple, distinct, and suited for clinical purposes, the following division into bubbles, clicking, crepitation, crackling, and vibration.

The first column in the opposite table exhibits the arrangement which I propose; the second, the corresponding terms in most frequent use; the third contains brief descriptions of the distinctive characteristics of each sound; the fourth notes the occurrence of the sound, whether chiefly in inspiration or expiration, or in both; the fifth shows the most common seat of each sound; and the sixth, the principal disease in which each sound is manifested.

I. BUBBLING SOUNDS are produced by air passing through secretion in the bronchial tubes, as peculiarly occurs in bronchitis; in those of moderate caliber, constituting what has been usually designated mucous rhonchus. The smaller bubbling rhonchus produced in the capillary bronchi, commonly known as subcrepitant, should rather be termed sub-mucous; if, from respect to long usage, the somewhat questionable term "mucous" be retained. To these bubbling sounds the term rhonchus is appropriate; but I do not dignify with this title sounds probably produced externally to the cells, such as crackle, and true crepitation; which are not proved to have any relation to the passage of air through secretion, or along vibrating tubes.

	Sounds.	Synonyms.	Character of sound.	Relation to Inspiration.	Relation to Expiration.	Common seat.	Accompanying disease.
I.	Bubbling.		Unequal irregular bubbles, altered by cough.				
	a. Bubbling rhonchus.	Mucous rhonchus.		———	———	Middle of both lungs.	Bronchitis.
	b. Small bubbling rhonchus.	Subcrepitant rhonchus.	Few irregular bubbles.	———	———	Base of both lungs.	Capillary bronchitis.
	c. Gurgling.	Cavernous rhonchus.		———	———	Summits of both lungs.	Excavation.
II.	Clicking.	Humid crepitation, or humid crackling rhonchus.	2, 3, or 4 clicks.	———	———	Ditto.	Softening tubercle.
III.	Crackling.	Dry crepitation, or dry crackling rhonchus.	2, 3, or 4 dry sharp sounds.	———		Ditto.	Unsoftened tubercle.
IV.	Crepitation.	Crepitant rhonchus.	Numerous minute similar rapid puffs, like salt on the fire, or rubbing a lock of hair between the fingers.	———		Base of one lung.	Pneumonia.
V.	Vibration.						
	a. Sonorous rhonchus.			—	———	General	Bronchial asthma, etc.
	b. Sibilant rhonchus.			———	—	General	

II. Clicking consists of a series of sounds, few in number, exactly corresponding to the term, audible in some degree during expiration as well as inspiration, and probably never existing except when softened tubercle is present.

III. Crackling, a term which itself defines the sound, consists of a few (not more than three or four) crackles, limited to the period of inspiration, seeming to arise at a distance from the ear, probably produced externally to the cells, and characteristic of the first stage of phthisis, although not invariably present under such circumstances.

IV. Crepitation consists of more numerous and finer sounds than crackling. It is also confined to the period of inspiration, and is probably due to viscid secretion in the cell-walls, occasioning difficulty in their expansion. It is peculiar to pneumonia.

V. Vibrations. Of sonorous, grave, or cooing, and sibilant, shrill, or whistling rhonchus; (sounds resulting mainly from vibration, and indicating flattening or narrowing of tubes, such as is common in chronic bronchitis,) it may be sufficient to remark that, when occurring interruptedly, these rhonchi may be occasioned by vibrations of air, probably produced by the intervention of pellets of mucus, as is sometimes observed in pertussis; but that, in proportion to the persistency of these sounds, there is reason to suspect turgescence or thickening of the membrane, or effusion in the submucous tissue.

A few incidental remarks may here be expedient, in order to explain a little more particularly the modifications above suggested.

The term subcrepitant rhonchus has been so long and so extensively employed, that the attempt to displace it may seem a bold and doubtful experiment; but I scarcely know a medical expression which has tended to produce more danger in practice. The term conveys to the mind the idea of a sound analogous to that usually designated crepitant rhonchus, but which I propose to call crepitation; and has, in consequence, led to injurious depletion. If asked to specify the greatest abuse of auscultation with which I am conversant, I should instance the leeching and antimonializing of children in certain pectoral affections, of which the subcrepitant rhonchus is a prominent symptom. Under the cover of a pedantic numerism, the cure of pneumonia without depletion has, on the continent especially, been assumed to be common; because this so-called subcrepitant rhonchus, although really differing in character of sound as well as in cause, has been mistaken for the rhonchus characteristic of pneumonia. A reference to the table will show the marked difference between these sounds.

As respects diagnosis and treatment, I cannot but think that great importance may be attached to the co-existence of certain sounds with expiration as well as with inspiration; since with certain qualifications particularly in reference to vibratory rhonchi, the presence of a morbid sound, during expiration, may be considered to afford evidence of the presence of secretion within the cells or tubes. This view is supported by the concurrence of clicking from softened tubercle with both respiratory actions, as contrasted with the inspiratory crackle of the first stage of phthisis. The

same peculiarity distinguishes the small bubbling (submucous rhonchus) from true crepitation (crepitant rhonchus,) which resembles the noise produced by rubbing a lock of hair between the fingers, and conveys to the mind an idea (probably in harmony with the fact) of the abrupt forcing open of cells, rendered less yielding by glutinous deposition in their walls. If the cause commonly assigned for "crepitant rhonchus,"—namely, air passing through secretion, were correct,—the air in repassing should produce a rhonchus during expiration also. The presence of viscid secretion within the pulmonary cells in cases of pneumonia may be acknowledged, without conceding that this secretion is concerned in the production of crepitation; indeed, its tenacity may be a reason why bubbles are not produced, the caliber of the capillary tubes to a certain extent remaining free. When, on the resolution of pneumonia, the secretion becomes less viscid, and occasionally more copious, the rhonchus changes its character, and the sound which has been designated the "redux crepitant rhonchus," having more of a bubbling character, and more or less audible during expiration, is produced. The sound sometimes termed "continuous subcrepitant rhonchus," existing only during inspiration, and accompanying pulmonary congestion, such as attends some forms of fever, I should regard as a subcrepitation, not as a rhonchus.

As respects the treatment of inflammatory affections of the lungs, it may not be inappropriate to mention that, in proportion as sounds are confined to inspiration they afford reason for depletion, but that, in proportion as the rhonchi become bubbling, they indicate

secretion, and suggest a discontinuance of antiphlogistic treatment.

Some authors, otherwise instructive, have complicated the subject of auscultation by looseness of expression, as well as by over refinement. Dr. Stokes, for example, in a work generally admirable for breadth of view and clearness of style, has sanctioned the use of that ambiguous term "muco-crepitant rhonchus;" respecting which it has been well observed that, if twelve physicians were asked the meaning, it is doubtful whether any two of them would agree. It is a sufficient proof of the vague manner in which auscultatory terms are employed, that when an author uses the word crepitation, we are often at a loss to determine whether he intends dry crepitation (crackle,) moist crepitation (clicking,) subcrepitant rhonchus (small bubbling rhonchus,) or the true crepitation ("crepitant rhonchus") of pneumonia.

The advantage of introducing terms so diverse as those suggested in the present plan is obvious. If we speak of crackle, the first stage of phthisis is indicated; if of clicking, the stage of softening; if of crepitation, pneumonia is detected; if of bubbling or small bubbling rhonchus, secretion more or less copious is known to be present in the different orders of the bronchial tubes.

The distinctions thus proposed may be open to incidental objections; and doubtless the phenomena observed in practice are not likely exactly to correspond with systematic arrangements; but the beginner requires broad distinctions, and his own studious care will familiarize him with the requisite modifications.

It should be remembered that the loudest sounds are not the most important, although catarrhal affections of the larger tubes may seem, to the novice more alarming than the fine crepitation of pneumonia, or the delicate crackle or clicking of phthisis. Skoda has expressed an opinion that dry crepitation (crackle,) and moist crepitation (clicking,) are bronchial sounds, and have no necessary relation to consumption. I cannot concur in this conclusion; although aware that varieties of subcrepitation may be mistaken for them, if we overlook the modifications produced in bronchial sounds by deep inspiration, or cough. If a doubtful sound is removed by cough or superseded by vibration sounds, on deep inspiration, we may with little exception conclude that it is not crackle, or clicking.

Let me venture to urge the desirableness of avoiding the mongrel combination of different languages, too common in medical descriptions, and of adhering, whenever practicable, to our own mother tongue. The avoidance, as far as possible, of foreign expressions is important to simplicity, to accuracy, and, one is almost tempted to add, to patriotism. And, although in this particular department of physical science, the use of French words has a special ground, it is yet better to sacrifice this consideration; since, whenever our own language is deficient in descriptive terms, Greek words, or Latin words of Greek derivation, have the superiority in expressiveness, and in their accordance with our own. Of this truth, the word "terminus," for the extremity of a railway line may furnish an example. For the purpose of designating certain unnatural sounds, not easily expressed by any of our English

words, the word "rhonchus" is perhaps the most appropriate, from its compass and significancy; but there are advantages in restricting its application to sounds produced by air permeating tubes or cells, modified by the condition of those tubes or cells, or of the fluid through which it passes.

It may be objected that the introduction of new terms would tend to increase the perplexity which we desire to avoid; but this difficulty may be in a great measure obviated if, in using words not generally adopted, the best understood of the synonymous expressions most in vogue are placed in parentheses; for example, crepitation (crepitant rhonchus,) bubbling rhonchus (mucous rhonchus.)

In conclusion, it should be observed that the most accurate description of sounds, and the greatest aptitude in their detection, must never be considered sufficient without a careful investigation of collateral symptoms. A disposition to expect conclusive evidence from unassisted auscultatory signs has frequently entailed disappointment, and induced unreasonable disparagement of this branch of the medical art. A change of sound doubtless implies a change of condition; but, as various pathological conditions may sometimes induce a similar sound, other indications must be sought, in order to determine which of these conditions is present. Notwithstanding the definiteness of information regarding local affections which auscultation may often supply, no prudent practitioner would determine his plan of treatment, without taking into account such circumstances as the degree of rapidity or labour in respiration, the character of the expectora-

tion, and the amount of constitutional disturbance. The inadequacy of any single indication as a guide applies however still more to symptoms arising from sympathies, than to those depending on acoustic principles. There is in some minds (to use an expression of Dr. Markham's,*) "a barrenness of faith" leading them to distrust the details which conduce to a general truth, and it is doubtless possible to be unnecessarily minute in distinctions of sound; but the misuse of auscultation arises less frequently from undue refinement, than from a want of correct appreciation of the distinctions which are most significant in their indications, and most important in relation to practice. Disproportion is a principal cause of erroneous opinion, no less than of monstrous forms; but the errors of observers must not be charged on the method of investigation. It is better to begin with doubts and end with certainty, than to begin with confidence and end with distrust; but the intelligence of the present race of practitioners offers a guarantee for the judicious cultivation of this branch of science; and I cannot question that, whilst auscultation is studied with the caution and ingenuousness characteristic of true philosophy, it will never lose ground in the estimation of the Profession.

* Introduction to Translation of Skoda.

CLINICAL LECTURES

ON

DISEASES OF THE CHEST.

LECTURE I.

Importance of general symptoms—Physical signs—Hooke, in the seventeenth century, the proposer of Auscultation—Laennec—Importance of visible signs—Hydatids expectorated—Cracked-pipkin sound—Modifications of movement of chest by Phthisis—Pleurisy—Emphysema—Causes and treatment of Asthma.

GENTLEMEN,

THE hospital in which I have the honour of addressing you was founded for the relief of individuals suffering from a class of diseases, to which more than one-sixth of the annual mortality in this country is attributable. The opportunity for systematically studying this class of diseases has hitherto in this country been lamentably deficient, and no argument can be requisite to prove the desirableness of rendering this in-

stitution available for the communication of knowledge on the subject which it is specially adapted to illustrate. With this impression it has been determined to deliver a course of clinical lectures; and while conscious of the difficulty of the task which I have undertaken, I am encouraged by the reflection, that my duty is not so much to communicate opinions as to assist you in the observation of facts, and by the conviction that knowledge acquired by your own exertion will take root with more certainty, and prove more productive, than any opinions which I might attempt to transfer to you complete and mature.

Let me remind you, at the outset, that lectures on the diseases of the chest involve far wider considerations than those connected with the science of auscultation alone. The probable duration of the disease, and the chances of its relief, have no exclusive relation to the nature or extent of the local physical conditions. The various circumstances which characterize or modify the general constitutional state of each individual patient must be carefully considered before we can form a reasonable prognosis, or adopt a judicious treatment. Nevertheless, the various modes of physical investigation will, with propriety, engage a large proportion of your attention, for they will well repay your careful study, and will lose their seeming complication when patiently examined.

The systematic application of the ear to the investigation of thoracic diseases is of modern introduction; but it is not generally known that the suggestion of such a method of inquiry was really made by one of our own countrymen, about two centuries ago.

Robert Hooke, surveyor to the city of London in the middle of the seventeenth century, who is said to have been the inventor of spring watches, and even in his boyhood to have exhibited great ingenuity in the construction of clocks, records his opinion, that some modes of ascertaining the condition of artificial machinery might be extended with advantage to the investigation of the mechanism of animal life. The passage to which I refer is well worth your attention, and is at once so philosophical and definite, that you will probably feel some surprise that such a suggestion should have remained so long unnoticed.

"There may be a possibility," says Hooke, "of discovering the internal motions and actions of bodies by the sound they make. Who knows but that, as in a watch we may hear the beating of the balance, and the running of the wheels, and the striking of the hammers, and the grating of the teeth, and a multitude of other noises,—who knows, I say, but that it may be possible to discover the motions of internal parts of bodies, whether animal, vegetable, or mineral, by the sounds they make; that one may discover the works performed in the several offices and shops of a man's body, and thereby discover what engine is out of order, what works are going on at several times, and lie still at others, and the like. I have this encouragement not to think all these things impossible, though never so much derided by the generality of men, and never so seemingly mad, foolish, and fantastic that, as the thinking them impossible cannot much improve my knowledge, so the believing them possible may perhaps be an occasion for taking notice of such

things as another would pass by without regard as useless. And somewhat more of encouragement I have also from experience that I have been able to hear very plainly the beating of a man's heart; and it is common to hear the motion of the wind to and fro in the guts and other small vessels; the stopping of the lungs is easily discovered by the wheezing. As to the motions of the parts one among the other, to their becoming sensible they require either that their motions be increased, or that the organ be made more nice and powerful, to sensate and distinguish them as they are; for the doing of both which I think it is not impossible but that in many cases there may be helps found."

It may be interesting to you to hear a few particulars of this ingenious philosopher, a short notice of whom may not be thought inappropriate to the occasion of our meeting.

Robert Hooke was born at Freshwater, Isle of Wight, in 1635, and died in 1702. He was intended for the church, but a liability to headache interrupted his studies; and, on attempting to become a painter under the instruction of Sir Peter Lely, the same affliction, aggravated by the smell of paint, again changed his destination. He was for a time pupil to Dr. Busby. In 1655, he assisted Dr. Willis in his chemical illustrations at Oxford, and probably took a part in constructing the first air-pump, introduced by that eminent philosopher, Mr. Boyle. He started some ideas regarding the principle of gravitation, approaching so nearly to those which immortalized Sir Isaac Newton, that this great man, with the ingenuousness of true philosophy, gave Hooke full credit for an approximation to its discovery.

Robert Hooke, in his suggestions for an improved plan of building London, may be said to have anticipated some important measures of sanitary reform. He obtained, through Cornelius Drebbel, the first microscope used in England, and in 1629 discovered the cellular structure of plants, applying to the separate cells the name of utriculi. It is remarkable how little additional knowledge of importance was attained in this direction until 1833, when Robert Brown, in his work on Orchideæ, described the cytoblastema or cell nucleus.

You will agree with me that Dr. Tillotson, the Archbishop of Canterbury, exercised a sound discretion in making Hooke, by patent, Doctor of Medicine.

This short account of the observations and intellectual character of Hooke will not be unseasonable, if it serve to impress you with the conviction, appreciating as we do the ingenuity of his suggestion of helps to auscultation of the living body, that the rules for physical investigation are not arbitrary and mystical, but distinctly deducible from scientific laws.

The credit fairly due to Hooke in no measure detracts from the merit of Laennec. That distinguished physician, with scarcely a hint to help him from previous observers, excepting a questionable statement of Hippocrates, that a sound like boiling water could be heard in the chests of patients with watery effusion, and also a general remark on the advantage of listening to the breathing, by Double, the author of "Semeiologie," produced in two short years of observation the first edition of his immortal work "On Diseases of the Chest," which constitutes the solid groundwork of our

knowledge of thoracic diagnosis. Laennec, however, was fallible, and committed one important error; for being too much engrossed with the instruction derived through the ear, he disregarded the information obvious to the eye. To the great value of indications afforded by inspection, let me make it the object of this lecture to call your special attention. The two sides of the chest, when in a perfectly healthy condition, appear symmetrical in form, and similar in movement. A change in these respects, obvious to the practised eye, is usually induced by any serious disease of the lungs or pleura. Let me show you proofs of this statement by introducing to your notice four patients:—the first with a view to exhibit the movements of the chest, natural in character, notwithstanding the existence of constitutional symptoms otherwise tending to mislead; the second presenting a condition of chest produced by pleurisy and pneumonia; the third manifesting the characteristic movements attending phthisis; and the fourth the peculiarities which, in this respect, characterize emphysema.

George S——l, the patient now before you, was sent into this hospital, under the idea that "one lung was gone from consumption." But, although he had rapidly become thin, suffered from profuse night perspirations, and expectorated great quantities of "purulent matter," the aspect of the chest made me doubt the correctness of the opinion. You see that during inspiration the expansion on the two sides is equal, and that it is quite free even in the sub-clavicular regions. Your eye witnesses truly these important particulars.

This patient (George S——l,) aged eighteen years,

is of phlegmatic temperament, and orderly habits, but obliged by his profession, that of a musician, to keep late hours. He was admitted November 5th, 1850. At the age of six, and several times subsequently, he is said to have had considerable enlargement in the region of the liver, which subsided, but seventeen months since recurred to an unusual extent, and did not yield to remedies. About eight months ago, he had violent attacks of cough, attended with expectoration of frothy yellow matter; in about three days the tumour subsided, but he still continued to expectorate, the expectoration containing pieces of skin which he compares to gooseberry husks. Five months ago, fresh exasperation of his cough occurred, with expectoration of "bags of humour the size of a chestnut. When the cough was tolerably easy these bags came up whole; when the cough was hard, they broke, their contents being first ejected, and their skins afterwards." He asserts that he could feel the bags come from the region of the liver. About two months since, fresh exasperation of his cough occurred, with imminent danger of suffocation. He says he felt a tearing sensation about the liver, as if something required to be ejected.

He soon began to throw up skins, and a piece of what he called gut, "about a foot long," and was obliged to tear these from his mouth to prevent suffocation. A week afterwards he had a fresh attack of cough with expectoration of matter like yellow jelly covered with blood. He then brought up several pieces of shrivelled reddish skin, each of which, when stretched out, would have covered the fist. There was more blood mixed with them this time than before. For

three or four days after he continued spitting up a reddish humour containing small fragments of skin. Five weeks ago, during a period of two days, he spat up a large quantity of black congealed blood. Three days previously, and two days subsequently to his admission, he expectorated a peculiar peach-coloured matter, which, when submitted to the microscope, was found to contain pus and mucous globules, but no echinococci. He has always eaten much vegetable food, and been particularly fond of cabbages; has never had jaundice. His father was asthmatical; one of his brothers died of phthisis; another brother died at the age of four years, three days after the bursting of a tumour, immediately below the ear, which in the course of a month had gradually acquired the dimensions of a goose's egg, and on bursting gave exit to a fluid resembling water. A fortnight before this child's death, a film formed over the sight of both eyes, and four days before his death he became "stone blind."

S——l is five feet seven inches high, his weight nine stone, four pounds and a half. He sleeps well, but still has nightly perspirations, and expectorates about an ounce and a half daily, more easily on stooping or lying down.

There can be little doubt that this case is one of hydatids of the liver, which have by absorption and ulceration found their way into the lungs, and been expectorated. Various circumstances, particularly the improvement in his strength and the absence of echinococci in the expectoration, may encourage the expectation of his perfect recovery. In the cases of hydatids which have come under my observation, I

have generally ascertained one or more of the following circumstances,—hereditary liability, vegetable diet, or blows. This patient cannot recollect receiving any blow on the side. He has, however, taken much vegetable food, and the brother's history is remarkable in relation to hereditary tendency. Two inquiries present themselves in reference to the origin of these hydatid cases: first, What is the mode of introduction of the ova? secondly, Is there impaired vitality of some organ, rendering it apt to harbour these animalcules? The influence of moist food on sheep and rabbits, as increasing their liability to hydatids, is a matter of observation, and, from analogy, we should recommend in the human subject, when affected with these parasites, a nourishing animal diet. The promotion of the hepatic secretion is also desirable; the introduction of bile into acephalocysts seeming to be destructive to these parasites, and favourable to their elimination. The treatment of S——l has consisted chiefly in a generous diet, the administration of tonics, with taraxacum, and the application to the hypochondriac region of an ointment of iodide of potassium. His general strength is much improved, and the fulness in the hepatic region is subsiding.

The next patient whom I place before you has a very different aspect of chest. Even those of my audience who are at a distance can tell me at once, that the lower half of the right side of the chest is flattened, and scarcely moves in inspiration. You see also that the apex of the heart beats close to the left nipple, instead of its proper situation, namely, two inches below, and an inch within that part. You form a surmise

that the cause of these conditions is contraction from pleurisy, and further observation confirms the correctness of the suspicion conveyed through the eye. If the heart were displaced by existing effusion, you would, probably, see bulging rather than depression. You put your hand on the flattened portion of the chest as the man speaks, and the vibration of the voice is distinctly perceived; effusion therefore does not exist, for that would interrupt the communication of the vocal thrill. You make percussion, and find dulness greater than the false membrane on the pleura alone would produce, but the dulness lessens as you proceed upwards to the apex of the chest. The cardiac dulness is displaced, but not extended; that from the liver extends too much on the left. Accompanying the first sound of the heart, a loud murmur is heard near the apex, but not in the epigastrium, nor to the right of the sternum above the cartilage of the fourth rib.

This patient, Thomas C——, a sign painter, aged nineteen years, was admitted on the 23d of December, 1850; height, five feet, two inches, and three quarters; weight, seven stone, thirteen pounds; vital capacity by spirometer, 114. He has always lived well till lately, and has usually resided in London; has no hereditary tendency to phthisis; his father died of dropsy at the age of sixty-two, and his mother of jaundice at sixty. He enjoyed good health till three years and a half ago, during a voyage, when he received a severe blow on the right side of the chest, after which he expectorated about four ounces of blood. Six months afterwards he had rheumatic fever, and inflammation of the lungs, and his sputa were streaked with blood.

About eighteen months since he had a recurrence of hæmoptysis, he thinks to the amount of two quarts in a week, and since that time his breathing has been oppressed, and some degree of hæmoptysis has occurred whenever he has attempted to resume his occupation. He complains of a sensation of tightness of the chest on the right side, relieved by making pressure on the left; cough slight; expectoration frothy; respirations 32; pulse 88, not strong; digestive organs natural; enjoys exercise, but sleeps badly, and perspires at night.

In this case the cardiac murmur obviously indicates regurgitation from the left ventricle into the corresponding auricle. This regurgitation, however, is probably not considérable, for the circulation in a radial artery is not disturbed or irregular. There are various circumstances in this man's condition, encouraging us to hope that he will escape phthisis. The disease of the mitral valve is probably due to rheumatism, and such disease is not apt to occur in phthisical subjects. The dulness on percussion is least at the apex of the lungs, where tubercular disease is most common, and greatest at the part corresponding to the blow; which, by inducing inflammation and occasioning consolidation of the pulmonary structure, may have rendered the thrill of the voice more than usually observable. The frequent occurrence of hæmoptysis might excite suspicions of a tubercular tendency, but any such apprehension is qualified by the fact, that this occurrence was preceded and probably induced by a blow. A degree of friction sound at the border of the contracted part of the chest announces that some inflammation

of the pleura still exists. A blister has been in consequence applied, and the patient is improving under the use of iodide of potassium.

The next patient, George S——h, you observe, moves the right side of the chest moderately during inspiration, especially at the upper part, but the left side scarcely at all; you may suspect tubercular disease from this fact, and further examination confirms that opinion. Percussion yields a dull sound over the whole of the left side, and in the sub-clavicular region a sound is elicited, which some of you will recognise as amphoric, like that produced by filliping the distended cheek, and doubtless arising from the proximity of a considerable cavity almost full of air. If a smart stroke be given below the clavicle whilst the patient's mouth is open, you hear the sound denominated by the French, *bruit de pot fêlé*, resembling, as the designation implies, the noise produced by striking a cracked pipkin. You may imitate the cracked-pipkin sound by doubling the hands together rather loosely, and striking the back of one of them against the knee in such a manner as to allow some escape of air. The production of this particular sound by percussion of the chest is doubtless owing to the proximity of a considerable cavity, having yielding walls, and free communication with one or more large bronchial tubes. If, whilst the patient's mouth is open, you strike smartly over such a cavity, air escapes freely and suddenly from it into the bronchus, and thus the peculiar sound in question is produced. S—— has no hereditary tendency to phthisis, but for fifteen years has been scarcely free from either syphilis or gonorrhœa. The free use of mer-

cury, an unsettled life, and perhaps, an uneasy conscience, may have proved adequate to induce the disease. He began to cough three years since, and a year afterwards to lose flesh; ten months ago he expectorated about four ounces of blood; his sputa, green and viscid, average in quantity ten ounces in the twenty-four hours. Occasionally the cracked-metal sound is suspended, probably in consequence of the plugging of the bronchial tube by the viscid secretion. Pulse 84; respirations 32. There is a chronic ulcer on the leg, which we shall not attempt to heal, for he always feels better when it discharges freely. He has fluctuated considerably, but on the whole improved in strength under the use of cod-liver oil. Belladonna pills, and other remedies, have been tried for relief of the cough, but the medicine which benefits him most is the following linctus:—Hydrochlorate of morphia, one grain; diluted hydrochloric acid, five minims; diluted hydrocyanic acid, half a fluid drachm; syrup of squills, one fluid ounce. Water, one fluid ounce. Mix. One drachm to be taken when the cough is troublesome.

The last patient I have to introduce to you to-day is Charles B——. As you watch the movement of his chest, let me remind you that the advance of either of the five upper or "thoracic ribs" in ordinary inspiration should vary from ·02 to ·07 of an inch, and in an extraordinary effort may extend to about two inches; whilst the four or five inferior ribs, which obey the influence of the diaphragm, move outwards ordinarily from ·25 to ·30 of an inch, or in an extreme inspiration about an inch and a half. You will observe that the upper part of B——'s chest moves in correspond-

ence with this rule; but that the lower part, instead of advancing according to this rule, absolutely recedes. By means of Dr. Sibson's chest-measurer,* we may determine the exact amount of this deficiency of movement; or if you have not had sufficient practice for the dexterous management of this instrument, try that of Dr. Quain, in which the sliding joints are dispensed with. Even this instrument, however, excepting to those practised in its use, is not more trustworthy than the eye. In practice, the attentive eye soon detects the difference of form and movement associated with the diseases to which I have referred; but it is doubtless a great advantage to be able to state to others, by the aid of a graduated instrument, the exact amount of difference. If you strike this patient's chest, the sound elicited is clear; and you will have already recognised the characteristic movement of emphysema. The diaphragm, in contracting, affords space for the expansion of the lungs, but the pulmonary cells already filled cannot admit more air; atmospheric pressure, therefore, takes effect, and the ribs are forced inwards. This patient is a tailor. He has been subject to colds for ten years, owing, he thinks, to transitions from hot workshops lighted with gas into the cold air. During the last three years these colds have become almost incessant. He has suffered from shortness of breath, and cough, and occasional paroxysms of dyspnœa. For the last ten months he has kept his room; sleeps in the sitting posture, with the body bent forwards; expectoration partly viscid, partly frothy;

* Medico-Chirurgical Transactions, vol. xxxi.

sonorous and sibilous rhonchi heard all over the chest; pulse 88; respirations 26. He has no hereditary tendency to phthisis, or to gout, and has never had hæmoptysis. Asthma would seem in this case to be developed in consequence of chronic bronchitis, and emphysema. Spasmodic asthma is a disorder depending probably on a peculiar susceptibility of that part of the nervous system which supplies the bronchial tubes and pulmonary cells, but a susceptibility which is rarely manifested in a decided manner until some additional influence is exerted, such as indigestion, gout, bronchitis, or cardiac disturbance. The emphysematous condition of the lungs, which frequently accompanies asthma, is well entitled to your careful study. It is connected with an atrophied condition of the pulmonary cells. If at an early period of the disease you make a microscopical examination of the affected lungs, you will observe on the membrane which sustains the vessels a number of little light dots, like oil-globules. At a later period you will find the membrane cribriform, and its meshes of vessels more widely separated than in the natural condition. Partly in consequence of the deficient supply of blood, and partly, it may be, from venosity of the circulating fluid, diminished liability to phthisis is a characteristic of emphysema. When cicatrized cavities are found in any part of the lungs, it is common to discover emphysematous portions in the adjoining structure, probably because the obliteration of vessels which attends such cicatrization tends to diminish the supply of blood to the neighbouring cells. Even when you have reason to suspect the existence of phthisis in emphysematous

subjects, you have ground to hope that the tubercular disease will be slow in its progress.

There is something very capricious in the asthmatic susceptibility. Some individuals have paroxysms only in town, some only in the country; others indifferently in town or country, but experience relief from the attack by immediate change either to one or the other. The late Duke of Sussex, who became asthmatical at a very early age, always escaped the paroxysms when at the foot of Vesuvius, but suffered repeatedly when residing in Naples. Measures which immediately relieve the fit in one individual are useless in another. Sometimes indeed in the same subject a remedy at one time efficacious, will at another time utterly fail. Thus, in our patient, C. B——, whose case has just been described, smoking stramonium at first afforded instantaneous relief, but subsequently failed. The inhalation of chloroform almost invariably relieves the asthmatical paroxysm, but its use is not to be indiscriminately recommended. In B—— the pulsation of the heart can be seen at the epigastrium, indicating, what is very common in such cases, some dilatation of the right side of the heart, as a consequence of the obstruction in the pulmonary circulation; and what you know of the influence of chloroform on the heart should make you cautious of its administration under such a complication.

It is therefore satisfactory to have other measures in reserve; and in many instances I have found remarkable relief experienced from the use of blotting paper dipped in a saturated solution of nitrate of potash, dried, and then set fire to on a plate so placed as

to expose the patient to the vapour. Whether the efficacy of this measure be owing to empyreumatic bituminous vapour, or to nitrogenous fumes, I cannot tell. I can neither explain its remarkable efficiency in some instances, nor its failure in others; but it is a remedy of real value, and has been particularly recommended by Mr. Harrison, of Broughton, near Manchester.

But it is not enough to relieve the paroxysms: you must aim to accomplish permanent amendment, and with this view must not be satisfied till you have rectified every disordered function, and improved to the greatest possible extent the nervous tone of your patient. Above all, endeavour to subdue any accompanying bronchitis. In many instances grain doses of mercurial pill with antimony, when watchfully regulated so as to avoid salivation, and gradually suspended, as the rhonchus moistens, are with this view singularly efficacious. When, however, there is the least threatening of consumption, it is desirable to find a substitute for the mercurial pill, and the combination most similar in effect is probably iodide of potassium mixed with antimony, which latter medicine would seem to have a tendency to direct the influence of the iodide of potassium to the bronchial tubes. B—— has therefore taken a mixture according to the following prescription: iodide of potassium, three grains; potassio-tartrate of antimony, ten minims; tincture of henbane, fifteen minims; decoction of sarsaparilla, one fluid ounce; make a draught, to be taken three times a day; and the benefit has been obvious: the breathing having become easier, the paroxysms no longer recurring, and the sibilant rhonchus, which was formerly audible

during both inspiration and expiration, being confined to the latter, thus showing that the more minute tubes, which were previously so affected as to oppose an obstacle to the free admission of air during inspiration, have recovered their natural condition.

Is it probable that alum might prove useful as a remedy in asthma? It is almost a specific in lead colic and in hooping cough; diseases not without some analogy to asthma, in the paroxysmal character of the attacks, and perhaps in the correspondence of the nervous fibres through which the morbid influence is conveyed.

When a medicine is proved to have remarkable efficacy in any one disease, we may often extend its use to the treatment of other affections, if we can succeed in discovering what particular condition the remedy modifies, and in classifying together such other disorders as present a distinct analogy in reference to this condition.

LECTURE II.

Further illustrations of cracked-metal sound—Gangrene of hand—Obstruction of arteries by coagula—Hæmoptysis: its relation to consumption; causes, tendencies, and treatment.

At our last lecture, gentlemen, you had an opportunity of examining a patient in whom the cracked-metal sound was elicited by percussion. Here is another patient in whom this sign may be detected, namely, S. A. M——, a young woman, aged sixteen, admitted Oct. 28, 1850; who was born, and has always resided in London. Lost her father, mother, and sister from phthisis. Attributes her illness to getting her feet wet twelve months since, after which she began to cough, and shortly afterwards to expectorate. The expectoration six months since was very copious; on one occasion it was for a day and night offensive in taste and smell, and appeared to her to come in large quantity from the left side. At the time of admission she was subject to frontal headache; appetite good, but tongue red, and bowels relaxed; pulse, 98; respiration, 32.

Physical signs.—Flattening beneath both clavicles. Right side: defective expansion; dull percussion; cavernous respiration and cough. Left side: very slight movement in inspiration; percussion sound still duller than on the right side. "*Bruit de pot fêlé*" elicited by striking smartly the second intercostal space. The treatment adopted in this case, in addition to attention

to special symptoms, has been the administration of half an ounce of cod-liver oil, at first twice, subsequently three times a day. The improvement in this patient's general health is very decided, and you would not suspect from her appearance the existence of any serious disease. I call your attention to her case, not only as an example of the cracked-pipkin sound, but also as an encouragement to persevering treatment, even in seemingly hopeless cases; for the evidence of large cavities in each side of the lungs is conclusive.

You recollect the explanation formerly given of the cause of the cracked-metal sound—namely, the escape of air into a large bronchial tube from a considerable cavity, with yielding walls so near to the surface of the chest as readily to receive an impulse from the stroke made in percussion. The production of a similar sound by any other cause is so rare that I shall not now embarrass you by the discussion of that subject. Since last Wednesday, a poor woman, J. B——, has died in the hospital, in whom, during the whole period of her stay, this particular sound was remarkably distinct on making percussion under the left clavicle. I now exhibit the apex of the lung. You observe that it contains a cavity large enough to admit a melon, and that the pulmonary substance is at one part so much destroyed, that a portion of the cavity is absolutely bounded by the pulmonary pleura. Two or three bronchial tubes are seen opening into the cavity, one of which enters abruptly, and communicates directly with the left bronchus. Thus you perceive that all the conditions above described as contributing to the production of the cracked-metal sound, are distinctly ful-

filled. There was another circumstance of considerable interest, and, indeed, of rarity, in this patient's case:—namely, the occurrence of gangrene of the hand. On December the 15th, about a month before her death, she complained of numbness, followed by pain of the left hand, fingers, and arm; and these parts, on the 17th, were observed to be slightly livid; this lividity extended to within an inch of the wrist in front, and an inch and a half on the dorsal surface of the hand. The cuticle was raised into a vesicle on the dorsal surface of the first phalanx of the index finger. No sensation evinced when tried with a pin within an inch above the wrist. Temperature of the left dorsum, 76°; of the right, 93½°. Temperature of forearm also diminished, and superficial veins distended. No pulsation to be felt in the radial artery; pulse, 118; bowels confined. She was directed to have a drachm of castor-oil immediately, and repeated when necessary; a grain of watery extract of opium at night; and every four hours an ounce of the following mixture:—Half a drachm of sesquicarbonate of ammonia; three fluid drachms of spirit of sulphuric ether; five drachms of syrup; five ounces of decoction of Peruvian bark. Hand and forearm to be enveloped in cotton wool.

On the 21st, the lividity was in part replaced by redness, and sensibility had extended a little below the wrist. The pulse, which on the 18th had been 180, was reduced to 104. The watery extract of opium had been given for three days every six hours. To have six grains of chlorate of potash, with an ounce of decoction of bark, and a drachm of syrup, every four hours, and to continue the opium every four hours.

22nd.—Passed a restless night, dozing from time to time for ten minutes; pulse, 94; temperature of left dorsum, 72½°.

23rd.—Pulse, 92; temperature of left dorsum, 66°; of right, 81°; of inside of mouth, 94°; bowels confined; no pulsation below the subclavian artery. Morphia, in quarter-grain doses, substituted for the watery extract of opium, and castor-oil repeated. At night a turpentine enema was administered with good effect.

24th.—Pulse, 98; tongue dry; lividity partly superseded by redness; hand and arm very painful, especially when the cotton wool is temporarily removed. An additional allowance of brandy, wine, and eggs; a grain of opium at bed-time.

25th.—Pulse, 104; commencing discoloration of forearm; appetite improved. Two grains of opium at bed-time.

26th.—Passed a better night, but lividity extending on the dorsum; no sensibility short of an inch and a half above the wrist on the anterior surface, and three inches on the posterior surface of the forearm.

28th.—Pulse, 98; arm more painful. Ten drops of sedative solution of opium every third hour, and half a drachm at bed time gave considerable relief; but she continued gradually losing strength, notwithstanding the free use of stimulants.

On the 8th of January, the temperature of the left dorsum was 70°, and vesication had taken place on the anterior surface; forearm semiflexed; hand fixed in a position midway between pronation and supination; discoloration half way up the arm in front; three inches and a half behind; pulse, 116; expectoration very difficult. The quantity of chlorate of potash

was increased, and the opiates and stimulants continued.

On the 10th, diarrhœa; a rapid weak pulse; legs and feet increasingly œdematous.

Died on the 11th, at half-past two, A.M.

It was pretty evident that some cause had interfered with the circulation in the left subclavian artery. The post-mortem examination disclosed the nature of the obstruction. The arch of the aorta, and the arterial branches, as far as the palmar-arch, were removed by Mr. Hunt for examination. A coagulum extended for about three inches along the subclavian artery, occupying nearly the whole caliber of the vessel. It adhered strongly to the aorta near the opening of the vertebral artery, which on this subject arose from the arch between the left carotid and the subclavian, but this coagulum could easily be separated from the subclavian, and was pointed at the distal extremity. The left vertebral artery was narrow at its commencement, and was closely filled with dark-coloured coagulum. Coagula also occupied at their commencement the circumflex, ulnar, radial, and interosseous arteries, beginning an inch or two above their origin, leaving free those parts of the vessels which were most distant from any important branch. The coats of the aorta, for a space of about an inch in diameter at its fore parts, were thickened from atheromatous degeneration, which, under the microscope, exhibited fatty deposit in the circular fibres. In the centre of the diseased patch was a softened portion, half the size of a pea, consisting, as reported by Dr. Quain, on a microscopical examination, of aggregated granule cells, fatty particles, and cholestrine, and surrounded by calcareous deposit to the

extent of two or three lines; and, to a part of the altered structure, the coagulum was so strongly adherent that, when violently pulled, at a scientific society, a portion was left attached to the vessel. The heart was somewhat hypertrophied, but in other respects perfectly healthy. The explanation which some might suggest of the origin of the coagulation—viz., the diseased condition of the aorta—is to me unsatisfactory, and appears to remove the difficulty only a step. As subsidiary circumstances, I cannot help attaching some importance to the peculiar situation of the origin of the vertebral artery, as calculated to disturb the equable current of blood through the aorta; and also to the condition of the orifice of that vessel, which seemed to be narrow beyond what could be accounted for by thickening of the arterial tunics; and it appears to be an illustration, in addition to others which have come under my observation, of an opinion that parts which present anatomical irregularities are prone to become by preference the seats of disease.

Malformation indicates defect in the direction of formative energy, and it is not surprising that such defect should entail susceptibility to diseased action. The nature of the connexion between the diseased condition of a portion of the aorta and the gangrene of the hand is a fair subject for speculation; but it must not be forgotten, in reference to this inquiry, that examples of extensive and seemingly spontaneous gangrene have occurred without any evidence of arterial disease.

A case described by Mr. Solly,* of extensive gan-

* Transactions of the Royal Medico-Chirurgical Society, vol. xxiii., p. 237.

grene of the extremities of a child, in which the blood-vessels were found free from disease, is, in this respect, well worthy of consideration.

You will wish to hear a few additional particulars regarding J. B——. She had lost four sisters and a brother from phthisis, but enjoyed good health till two years since, when she suffered from menorrhagia for thirteen weeks. The catamenia ceased a year since, when she became affected with cough, and began to lose flesh. Four months before her admission into the hospital, and on a few occasions subsequently, her expectoration was streaked with blood, but it consisted chiefly of green, consistent, viscid matter. Although only fifty-two years of age, she appeared more than sixty. Hair and irides gray; arcus senilis remarkably apparent, especially on the right cornea; fingers clubbed; nails curved. She suffered occasionally from flatulent distention and from diarrhœa; this latter symptom was relieved by bismuth. She inhaled chlorine with relief to her cough, and for the same object also derived some advantage from lozenges, prepared according to the original formula of Sydenham:—sugar candy, two pounds and a half, boil in a sufficient quantity of pump water till it sticks to the end of the fingers; then add liquorice powder, elecampane, aniseed, angelica-seed, each half an ounce; orris powder, flowers of brimstone, each two drachms; essential oil of anise, two scruples; make lozenges according to art. These lozenges sometimes relieve, but cannot be expected to be so useful to the consumptive as Sydenham found them in common catarrhal cough.

We will now proceed to consider a symptom very

frequent in pulmonary consumption, and one which is apt to occasion considerable alarm in the minds of patients and their friends. I refer to *spitting of blood.* In proof of its frequency, I may mention that it has occurred in nineteen out of twenty-six cases of confirmed phthisis at present under my care in the hospital—that is, in seventy-three per cent.; of the seven exceptions, five are in the first stage. This proportion is now very different from that which calculations on a larger scale supply; and when spitting of blood occurs, unconnected with disease of the heart, or mechanical injuries, or suppressed catamenia, it is, perhaps, the most significant of any single symptoms of phthisis. You will observe that in the case of S. C. there is a murmur near the apex of the heart, accompanying, not superseding, the first sound, whence you conclude that there is disease of the mitral valve, not perhaps very considerable, but sufficient to occasion regurgitation into the left auricle, and we trace the disease to rheumatism. Hæmoptysis in this patient was preceded by a severe blow. We may fairly assume that in this case the hæmoptysis is probably unconnected with pulmonary disease: for, not to mention other reasons, rheumatic affections of the heart do not often co-exist with phthisis.

It is a popular opinion that "breaking a blood-vessel" often produces consumption, and even in medical writings you will sometimes find it implied that hæmoptysis often precedes phthisis. Is this opinion correct? Here is a table of the last twenty-four patients in whom I have observed hæmoptysis: it may assist your judgment on this question:—

Name.	Age.	Time of first occurrence of Hæmoptysis.	Quantity expectorated at once.	Total quantity expectorated at successive times.	First occurrence of Cough, &c.
W. H.	34	Five years since.	Six pints.	Ten pints.	Five years since.
J. W.	32	Eight months.	Four pints.	No recurrence.	Two years.
J. W.	42	Ten months.	Three pints.	Six pints.	Twelve months.
W. R.	21	Twelve months.	Two pints.	No recurrence.	Ditto.
P. R.	23	Six months.	A pint and a half.	Ditto.	Ditto.
D. W.	53	Twenty-two months.	Ditto.	Ditto.	Twenty-two months.
J. B.	22	Six weeks.	Very copious, producing syncope.	Ditto.	Nine months.
H. B.	20	Six months.	Half an ounce.	Four ounces and a half.	Thirteen months.
A. S.	37	Twelve months.	Half a pint.	Fourteen ounces.	Ditto.
G. S.	29	Ditto.	Five ounces.	No recurrence.	Three years.
M. A. B.	16	Four months.	A drachm.	Ditto.	Some years.
G. M.	26	Seven weeks.	Half an ounce.	Ditto.	Fourteen weeks.
E. H.	38	Eleven years.	Ten drachms.	Three pints and a half.	Twenty-three years.
E. D.	33	Four years.	Half an ounce.	An ounce.	Nine months.
W. S.	24	Nine weeks.	Ditto.	No recurrence.	Nine weeks.
G. J.	31	Six weeks.	Two drachms.	An ounce.	Ten months.
J. D.	36	Seven years.	Four ounces.	Sixteen ounces.	Twelve months.
E. F.	28	Two years.	Eight ounces.	No recurrence.	Two years.
J. W.	41	Fifteen years.	Uncertain.	Two ounces.	Seven years.
A. J.	46	Fifteen months.	Two ounces.	Five ounces.	Three years.
H. K.	26	Twelve months.	Uncertain.	Two pints.	Twenty months.
W. B.	29	Two years.	Four ounces.	No recurrence.	Nine months.
W. H.	15	Nine months.	Two ounces.	Ditto.	Ditto.
T. S.	24	Sixteen months.	Half an ounce.	An ounce.	Eighteen months.

In fourteen of the twenty-four, other symptoms, such as loss of flesh or strength, or changes of respiratory sound, which could not be conveniently entered in the table, preceded the hæmoptysis. In six patients one or the other of these symptoms, and the spitting of blood, were believed to commence together. In only four are we without evidence of the pre-existence of disturbed function. Even in these four it is highly probable that a careful examination, prior to the occurrence of the symptom in question, would have detected some change of respiration. Here is a young woman (M. W.) who has never had hæmoptysis, nor suppressed catamenia; her cough is only occasional, but her tongue is often loaded; there are fits of dyspepsia, with severe frontal headache, not referable to any peculiarities of diet. The catamenia are not interrupted. Her impaired health probably depends on tubercular cachexy; still, if she were not under medical observation, no circumstance would be recorded as indicative of phthisis. Listen to her breathing: in the left subclavicular region the inspiratory murmur is interrupted,—the air seems to enter the corresponding portion of the lungs by a succession of waves, instead of in a continuous stream. This sign, as I may hereafter prove to you, when isolated, is not a proof of tubercular deposition, but it is a somewhat ominous symptom, especially when associated with other changes, such as prolonged expiratory murmur, which in this patient exists at the apex of the opposite lung. To my mind we have evidence of tubercular deposit, but as yet no hæmoptysis has occurred. As respects treatment, you will observe an issue under the left clavicle,

produced by galvanism; plates of zinc and silver being connected together, and the zinc plate moistened with a saline solution applied to the skin. Various alterative and tonic medicines having been used, with a view to relieve the headache and dyspepsia, with only a temporary advantage, I determined to try the effect of a tablespoonful of yeast three times a day. This substance, originally introduced into medical use by a clergyman named Cartwright, has been considered beneficial in typhus. It often gives relief as a gargle to the sore-throat of scarlatina; and its remarkable power of separating sugar from its combinations, and altering its character, might lead us to anticipate its possessing properties competent to influence favourably the digestive process, and thus to check the mal-assimilation by which tubercular conditions affect the blood. Some observations by my friend, Mr. Sampson, have contributed to make me hopeful in this respect, and this patient seems to have derived benefit from the medicine in question.

But to return to the subject of hæmoptysis. When this symptom is considerable, great alarm is generally experienced by the patients and their friends, and the danger of sudden death is supposed to be considerable. Is such an event common? By no means. In men it is very rare, and many practitioners in the course of many years have never witnessed such an event in women. Such a catastrophe, however, is possible; it occurred, for example, in the patient from whose lung Dr. Carswell took this delineation, which I exhibit to you, in which a large irregular ulcer in the left bronchus near the bifurcation of the trachea, effected a communication with the pulmonary artery.

There are two circumstances in reference to the circulation in phthisical lungs which are unfavourable to the occurrence of profuse hemorrhage. In inflamed lung, the blood-vessels, though tortuous, are free, but in tubercular lungs the blood coagulates in the extremity of the vessels. But there is an additional point well worthy of your attention. When you look at this large vomica you observe a considerable band passing across it. Of what does this band consist? It contains no bronchial tube. Bronchial tubes readily ulcerate, and by that process expectoration from cavities is promoted. The band consists mainly of blood-vessels and cellular substance. Blood-vessels are inapt to ulcerate. The walls of the pulmonary arteries, when surrounded by tubercular ulcerations, instead of sharing the disorganization, usually thicken; by the deposition of fresh material, their caliber gradually lessens; after a time they cease to be pervious, they are filled with a thin, reddish, fibrinous plug, and transformed into solid cords.

It is probably only in those rare instances in which such a vessel is suddenly torn before the caliber is perfectly closed, that fatal hemorrhage is at all likely to occur. The popular idea that all bleeding from the lungs is produced by ruptured blood-vessels, is a serious error. The ordinary cause of hæmoptysis is doubtless compression or obliteration of the pulmonary veins by the tubercular deposit; in consequence of which, blood, interrupted in its natural channels, overflows or exudes into the neighbouring bronchi. If this explanation be correct, hæmoptysis moderate in amount must be regarded rather as beneficial than alarming. By preventing the stagnation of unhealthy blood it must tend to

oppose the extension of tubercular disease; and as far as a conclusion may be drawn from the cases under my care, the influence of hæmoptysis of considerable amount would seem to have been rather favourable than otherwise. You will observe that some of the cases of phthisis recorded in the table, accompanied with copious hæmoptysis, were remarkably slow in their progress. In six of the cases the quantity of blood expectorated at once has exceeded a pint, and the time which has elapsed since the occurrence of the profuse hæmoptysis to the present period has been, in these patients, respectively six months, twenty-two months, twelve months, ten months, eight months, and five years. In several of these instances, evidence of pulmonary disease preceded by many months the occurrence of hæmoptysis, and in some the disease has not yet advanced beyond the first stage. These facts are in harmony with my general experience, as showing that this symptom tends more to retard than to accelerate a fatal issue.

The practical bearing of these facts is obvious and important, as impressing the conclusion that undue haste to arrest hæmoptysis should be deprecated, and that, as a general rule, it is better to moderate this symptom by producing determination to other organs, than to employ direct astringents. You will find great benefit in many cases from the administration of a dose of calomel or mercurial pill, with henbane, followed by the use of half-drachm doses of sulphate of magnesia with diluted sulphuric acid, administered twice a day.

This plan has been adopted with a young woman now in the hospital, whose case, as presenting several particulars of interest, I will briefly relate.

E. B., aged sixteen, of sanguineous temperament, and who had lost her mother, an uncle, and two maternal aunts, from phthisis, was admitted on the 26th of December, 1850. Has been subject to pain of chest for ten months, and to cough for fourteen weeks. This cough was at first dry, but latterly accompanied with expectoration. She has been for four years affected with leucorrhœa. Catamenia, which commenced fifteen months since, at first profuse for seven months, subsequently irregular, and for the last four months suppressed. Has pain under the left mamma; general appearance delicate, but not very unhealthy.

A fortnight before admission, on awaking in the morning she found the blood flowing from her mouth, and the bed-clothes largely soaked with it. She estimates the quantity at a pint. The flow stopped half an hour after she awoke, but has recurred every night since. She thinks she brought up three or four pints altogether—a pint the first night, and about three ounces every night since.

In the day-time the sputa are not even streaked with blood. Her tongue is furred; appetite bad; bowels much confined; urine thick and scanty—ten ounces in twenty-four hours, specific gravity, 1037; cough of most distressing character; sometimes twenty-two fits in ten minutes. Sleeps very badly half an hour at a time, and is then awoke by coughing.

Physical signs.—Slight dulness and imperfect inspiration on right side; prolonged expiratory murmur on both. For a day or two she was treated with sulphuric acid and opium, but on Dec. 28th, the pulse being 135, respirations 48, digitalis and hydrocyanic acid were given.

Dec. 29th.—Pain in the left side relieved by dry cupping, but the hæmoptysis continuing, alum was added to her mixture.

30th.—Hæmoptysis during the night amounted to four ounces. Half a grain of tartarized antimony; five and a half ounces of water; half an ounce of syrup of poppies. An ounce of this mixture every four hours. A small blister on each side of the dorsal spine; six leeches to the vulva.

31st.—Leeches bled freely; hæmoptysis last night only to the extent of an ounce; incessantly vomiting; chloroform to be inhaled in order to check the vomiting. Three grains of calomel; five grains of extract of henbane, in two pills, immediately. A drachm of sulphate of magnesia; an ounce of rose water; ten minims of diluted sulpuric acid; three minims of diluted hydrocyanic acid; every four hours.

Jan. 3rd.—Hæmoptysis gradually lessening.

On the 6th of January inhalation of turpentine was tried daily, and on the 8th, the same remedy internally, in doses of fifteen minims; under this plan, the spitting of blood was much subdued, but returned in a few days; and, in consideration of the interruption of the catamenia for seven months, tincture of lytta, in half-drachm doses, was administered with decided advantage.

This case is in various ways instructive. It shows you how, even such a symptom as hæmoptysis may be modified, when associated with hysteria, and may indeed partake of the capriciousness of the hysterical condition. It serves also to confirm the statement that considerable expectoration of blood may exist without

any serious consequences, and with relief rather than aggravation of the associated pulmonary disorder.

A. C——, another patient whom you have seen, has had hæmoptysis removed by the use of turpentine, the inhalation of which has also materially diminished the quantity of expectoration.

Let me repeat that hæmoptysis, when slight, is often useful, and should not be hastily checked. When it is considerable, if of an active character, as indicated by full hard pulse, heat and oppression under the sternum, and heaving of the diaphragm, cupping, or even bleeding may be requisite. In less formidable attacks, anti-congestive remedies, and small doses of sulphate of magnesia with sulphuric acid may be given, or antimony with nitrate of potash. Ipecacuanha has been recommended, in doses of two grains every quarter of an hour, but this remedy has disappointed me. A strong solution of dinner salt, as formerly recommended by various physicians, especially by our countryman Dr. Percival, and by Dr. Rush of America, is still employed by some practitioners. In the few cases in which I have administered this remedy on account of hæmoptysis, no obvious beneficial result has followed; but circumstances might occur to render the trial of so convenient a remedy desirable, and several medical friends have assured me of its efficacy. Dr. Ross of Madeira, for example, has frequent recourse to it. His plan is to give half an ounce of the salt in two ounces of water at once, and subsequently a drachm three times a day or oftener, while the hæmoptysis continues. If the hæmoptysis be passive, direct astringents may be required, of which alum is one of the best; and perhaps this re-

medy acts more efficiently when allowed to dissolve in the mouth than when taken in mixture. The following prescription is appropriate for this purpose. Take of powdered gum arabic, and of white sugar, each three drachms; powdered tragacanth, a drachm and a half; alum, two drachms; catechu, three drachms; rose-water, as much as sufficient for a mass to be formed into sixty lozenges.

The most powerful of direct astringents in the treatment of urgent cases, is acetate of lead. You may give two grains for a dose in a mixture, with half a drachm of distilled vinegar; or, if you prescribe it in a pill, give acetic acid immediately afterwards, in order to counteract the tendency to the formation of carbonate of lead, which is apt to produce colic. Gallic acid is not so prompt and effectual as acetate of lead, but suits some cases remarkably well. Turpentine is probably one of the most certain and suitable remedies in a majority of instances. Two drachms of oil of turpentine, two ounces of mixture of gum arabic, and four ounces of infusion of matico, or of cinnamon water, with thirty minims of tincture of capsicum, form an appropriate mixture, of which an ounce may be given at intervals. In slight cases the infusion of matico alone is often sufficient.

When the hæmoptysis is associated with suppressed catamenia and hysterical symptoms, lytta is of great value; but let me repeat the opinion, that in a majority of instances of phthisis moderate expectoration of blood is useful, and that whilst you allay the apprehensions of the patient you may leave the symptom to its own course.

LECTURE III.

Expectoration as a means of diagnosis—Its varieties in different conditions and periods of Consumption: 1st, salivary; 2nd, mucous; 3rd, flocculent; 4th, purulent—Proportion of saline matter—Changes indicative of amelioration—Bronchial polypi—Expectoration of conferva—Vegetable parasites in animal structures.

One of the circumstances to which your attention will be continually invited by patients suffering from pectoral complaints, is the "expectoration," a term which we use in its popular acceptation as applied to the material eliminated from the chest. I take an early opportunity of introducing this subject, as it constitutes one of the symptoms sometimes inadequately regarded by those whose minds are engrossed by the study of auscultation. It may be acknowledged that conclusions were formerly drawn from the appearance of the expectoration with unwarrantable confidence; great importance was attached, for example, to means by which pus could be distinguished from mucus, on the assumption that the presence of pus in the expectoration was a diagnostic mark of the existence of phthisis. We now know that this opinion is inaccurate, and that purulent expectoration may attend bronchitis and other affections, and be absent in consumption.

At the present time, however, it may be more seasonable to warn you against the opposite error, and to show you how much valuable information may be derived from examining the expectoration.

There are certain general rules worthy of regard in connexion with this subject. Thus, if a person with some severe chest complaint coughs frequently, and expectorates only frothy, salivary-looking fluid, you suspect pleurisy. If another patient expectorates a glairy fluid, resembling white of egg, you suspect bronchitis; if the expectoration have a rusty tinge, and resemble thick gum-water coloured with blood, you are not likely to err in recording pneumonia; if you are told of a sudden expectoration of a gush of pus in considerable quantity, especially if it be fetid, you would expect to find that matter accumulated in the cavity of the pleura had found its way into the bronchial tubes.

We have said that purulent expectoration may occur both in bronchitis, and in phthisis. When, however, long-continued purulent expectoration is unaccompanied with any distinct rhonchus, you may be tolerably certain that the source is a vomica, and not the bronchial tubes. Let us consider to what extent we may derive aid in our diagnosis of the existence and stage of phthisis, from an examination of the sputa. We must not expect conclusive evidence from this, or indeed from any other single symptom, in phthisis; since the disease may proceed to an advanced period unaccompanied with expectoration, or the expectoration may be for a time suspended, especially under the successful employment of medical treatment.

In S. A. M., for example, a patient whom you formerly examined, you have unquestionable proof of vomica in the cracked-metal sound, which you readily detect by making smart percussion in the second left intercostal space, but there is scarcely any cough, and that cough is dry. Still there are certain common circumstances regarding phthisical sputa, which may be briefly detailed. A member of a consumptive family feels a little out of health, and has a dry morning cough; after a time the cough is attended with slight expectoration, at first salivary, after a short period becoming viscous, but transparent and homogeneous, subsequently dotted, and then streaked with blood, the striæ becoming by degrees more abundant. After a longer or shorter time, whitish opake spots appear, of the size of a pin's head, rounded or flattened, giving a pearly aspect to the expectoration. These multiply and enlarge, and ultimately form masses of an opake white or dark gray colour, varying in size from that of a lentil to that of a florin, irregularly rounded and chequered at the side, sometimes streaked with blood, and floating in a viscous transparent fluid. At a more advanced period of the disease, the expectoration is purulent, spreads out into a porraceous mass, and shortly before death is often surrounded by a pinkish halo.

The changes thus described do not necessarily occur in so uniform a manner; but the most characteristic appearances attending the series of changes of the expectoration in the different stages of the disease may be conveniently described under four divisions; namely:—

First, the salivary, or frothy.

Secondly, the mucous.

Thirdly, the flocculent.

Fourthly, the purulent, or porraceous.

The first is what you would expect from irritation, the result either of pulmonary congestion, or of slight tubercular deposit.

The second would indicate a more confirmed affection of the bronchial tubes.

The third is peculiarly characteristic of secretion from a vomica, modified by the absorption of its thinner constituents.

The fourth is indicative of phthisis far advanced, and (if unmixed with froth) usually involving both lungs.

Let us see how far such a representation is in harmony with the facts at present accessible in the hospital. I show you some examples of simple frothy expectoration. The first is coughed up, in the quantity of four ounces in the twenty-four hours, by the patient I now introduce. W. G., aged forty-two, a postilion, admitted into the hospital Nov. 18, 1850, says he has been for eight years subject to asthmatical cough; fourteen months since he observed some streaks of blood in his expectoration, and during the last fourteen months has been losing flesh; the pulse is 84; respirations, 28 in a minute; height, five feet two inches and a half; vital capacity, 140. These circumstances are sufficient to make you suspect the nature of the disease; at the same time, the local signs are so slight,—being almost confined to the existence of a little dulness on percussion at the apex of the right lung, and rather strongly pronounced breathing under the left

clavicle,—that we may reasonably form the conclusion in harmony with the appearance of the expectoration, that the disease is in the first stage, and not at present considerable. The second variety of expectoration is mucous, viscid, transparent. Two very good examples are before you. This patient, W. D., expectorates half an ounce daily of this kind of fluid; he is a gardener, has no hereditary liability to phthisis, and attributes his complaint to bad diet. He began to cough last August, and at that time expectorated about half a pint of salivary frothy fluid in twenty-four hours. This patient's pulse is 78; height, five feet four inches; vital capacity, 155. The upper part of the left chest expands less than the right during inspiration, and is rather dull on percussion. The expiratory murmur is prolonged, being equal to the inspiratory at the apex of each lung. There has never been hæmoptysis. The disease is evidently rather more advanced than in the patient previously introduced to you; but as yet there is no softening of tubercle, and the expectoration depends on bronchial irritation. W. D.'s expectoration contains a little blackish matter, resembling what is often supposed to owe its origin to carbonaceous matter abounding in the London atmosphere; but the colour fades on the addition of nitric acid. It cannot, therefore, be carbon; it is rather the black matter of pigment cells, known to be formed under slight, but not under severe forms of bronchial inflammation. On applying a little heat, and examining this expectoration with the microscope, crystals, apparently of triple phosphate, may be seen. By the politeness of Dr. Garrod, I am able to show you another microscopical preparation of

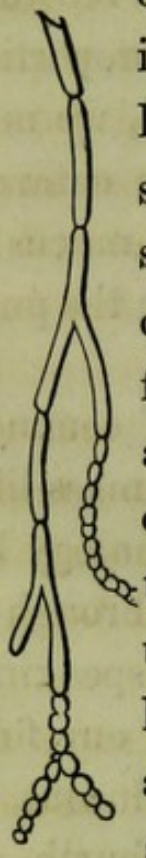
triple phosphate expectorated. It is from a patient concerning whom a strong impression had been entertained of the existence of phthisis. Dr. Garrod, however, ventured to pronounce the affection bronchial, and not intense. The progress of the case has established the correctness of his diagnosis, and serves to confirm an opinion which I am inclined to entertain, that the proportion of salts in the expectoration attending bronchitis appears to be in an inverse ratio to the degree of inflammation present. Such an opinion is at least in harmony with the interesting observations recorded by Mr. Brett.* As an approximation to the proportion of saline matter in the solids expectorated, we may mention from twenty to thirty per cent. in catarrh, from fifteen to twenty in the more opake mucus of chronic bronchitis, and rather less than ten in the puriform expectoration of advanced phthisis.

Dr. Babington found that the addition of common salt converted pus after a time into a viscid mass like mucus. Dr. Golding Bird perfected the analogy by adding soda to pus, and then transmitting through it a current of carbonic acid.† Chemically speaking, then, the watery frothy-looking secretion of our first division is chiefly serum; the second, or mucous, is albumen mixed with saline material; the fourth, or purulent, the blood-globules devoid of their colouring matter, combined with coagulable albumen; and the third, or flocculent, has the mixed character, varying according as the principal proportion of material is supplied by the vomica, or by the bronchial tubes.

* Transactions of the British Association for the Advancement of Science. 1837.

† Guy's Hospital Reports, No. 6.

In the next patient, the boy W. J., if you listen attentively under the right clavicle, you will perceive as he speaks, especially in a whisper, a sound resembling pectoriloquy. It is transmitted to the ear like bronchophony, but still it seems to me to be formed within a small and limited space. This is a case illustrating the difficulty of distinguishing between bronchophony and pectoriloquy. My own impression is that a little cavity is forming in this situation, and the appearance of the expectoration is favourable to this opinion. You will observe that, although it is chiefly composed of transparent gelatinous-looking material, like that of W. D., yet its surface is striated here and there with little streaks of pus. I examined this sputum microscopically, not without the expectation of finding saline crystals. In this I was disappointed, but observed a peculiar conferva, of which I show you a drawing, resembling that described by Dr. Hughes Bennett,* not unlike the Penicillium Glaucum of Link, having jointed tubes dichotomously branched, and giving off at the extremity little spores arranged in bead-like rows.



It is the third variety of expectoration, however, to which I am specially anxious to direct your attention, because with scarcely any qualification you may regard it as pathognomonic of phthisis. Several specimens of this variety are on the table. When spat into water, you observe it assuming the form of globular masses,

* Transactions of the Royal Society of Edinburgh, 1841, Part II.

like little balls of wool or cotton. Some of these masses have subsided, some are suspended at different depths, others float on the surface, sustained by bubbles of air entangled in the surrounding mucus. Similar expectoration spat upon the plate has taken the form called by the French nummular, being in flattened, rounded, separate masses, and assuming a shape not unlike that of pieces of money.

Some of the patients from whom these specimens were obtained are before you. Examine J. E.; you hear in the right subclavicular region two or three distinct clicks accompanying inspiration and expiration. This is humid crepitation, and so good an example of the clicking variety as to give appropriateness to the term of "clicking rhonchus," employed by my colleague Dr. Cotton, as applicable to this conclusive sign of softened tubercle.

E. P. has distinct indications of vomica, and the cavernous gurgling attending her cough, heard under the left clavicle, accords with the information supplied by the ragged flocculent masses floating in her expectoration.

Having given examples of progressive changes for the worse, let me now indicate the reverse alterations characteristic of amelioration. When the process of contraction is going on in a vomica, a diminished quantity of expectoration is a common and a favourable symptom.

C. V. a month since expectorated four ounces daily: —now the expectoration has ceased. This result may partly be attributed to improvement of health under the use of appropriate regimen, and the administration

of cod-liver oil; but has probably been promoted by the inhalation of turpentine.

Profuse secretion into a phthisical cavity is probably a cause as well as an indication of deteriorated blood; and measures which are consistent with a judicious regard to the accompanying conditions, may be advantageously employed in order to lessen its quantity. When the bronchial tubes contribute much to the supply, the skin being moist, and the appetite defective, pyroligneous spirit may sometimes be useful, but generally speaking, tannic acid will probably be found a more appropriate medicine.

Under suitable treatment, the daily expectoration in L. D. is reduced from ten ounces to a few drachms, and instead of being, as formerly, purulent, has become serous and frothy. The physical signs correspond; pectoriloquy, although still existing, is less extensively heard than formerly, and the chest over the affected part is contracting.

You find in many of these spittoons a combination of purulent and frothy expectoration. In others, there is no froth. What is the import of this difference? Does the frothy intermixture result from the comparative immunity of one of the lungs from disease? The list before you furnishes some facts favourable to such an opinion. This table gives a few particulars regarding the expectoration of twenty-nine patients, at present under my observation. Such tables, even when they may not present any special novelty, are not the less instructive, since they serve faithfully to exhibit all the facts under observation, and thus to counteract any tendency to hasty generalization.

I may mention that one of these patients, J. L., originally entered as having phthisis in the third stage on one side only, but yet with unmixed purulent expectoration, has been carefully examined with a view to the question just proposed, namely, the cause of the admixture of frothy with purulent expectoration. The result of the examination is instructive. The entry was incorrect. There is not only gurgling rhonchus in the left subclavicular region, but cavernous metallic cough in the right interscapular region.

Phthisis, therefore, exists in this third stage on both sides. The patient to whom I refer coughs up the porraceous expectoration of peculiar tint, which I now show you, and which is of the kind usually occurring within two or three weeks, sometimes only a few days, of death. He is rapidly losing strength, and I fear the issue will soon determine the correctness of the indication.*

* This patient died sixteen days afterwards.

NAME.	AGE.	DISEASES.	STAGE.*		SPUTA.	
			RIGHT SIDE.	LEFT SIDE.	DAILY QUANTITY.	CHARACTER.
W. G.	42	Phthisis.	1	1	Four ounces . .	Frothy.
M. M.	29	Ditto (?)	1	..	An ounce and a half	Ditto.
A. S.	37	Ditto.	1	2	Six drachms . .	Mucous and frothy.
W. U.	32	Ditto.	1	1	Two ounces . .	Ditto.
W. D.	..	Ditto.	..	1	Half an ounce . .	Mucous; transparent.
W. S.	15	Ditto.	..	1	None.	
W. J.	14	Ditto.	3 (?)	..	Half an ounce . .	Mucous transparent, with yellow striæ.
G. S.	18	Hydatids.	..	..	Ditto . . .	Mucous; peach-coloured.
W. H.	34	Phthisis	1	1	Two ounces . .	Mucous and frothy.
C. B.	47	Emphysema.	..	..	Three ounces . .	Salivary and frothy.
G. S.	29	Phthisis	2	3	Four ounces . .	Purulent; a little froth.
W. K.	46	Ditto.	1	..	. . . . .	Mucous; frothy; sanguinolent.
E. H.	..	Ditto.	1	..	Ten Drachms . .	Mucous; frothy.
M. A. F.	32	Ditto.	..	1	None . . .	
M. B.	17	Ditto.	1	Cavity contracting.	A drachm and a half	
E. H.	33	Ditto.	..	2	An ounce and a half	Muco-purulent; frothy.
S. A. M.	16	Ditto.	..	3, cavity contracting.	None . . .	Formerly copious and purulent.
M. W.	18	Ditto.	..	1	None . . .	
L. D.	21	Ditto.	3	3	Three drachms .	Improving.
S. B.	21	Ditto.	1	1	Half an ounce . .	Mucous; frothy.
M. M.	29	Ditto.	..	1	An ounce . .	Frothy sanguinolent.
H. B.	25	Ditto.	2	2	Four ounces . .	Muco-purulent; some froth.
E. P.	27	Ditto.	(?)	3	Ditto . . .	Muco-purulent; flocculent.
L. B.	13	Ditto.	3	3	. . . . .	Flocculent.
S. A. B.	18	Ditto.	..	1	A drachm and a half	
M. M.	29	Ditto.	1 (?)	..	An ounce and a half	Salivary; frothy.
Mary M.	29	Ditto.	3	2	Two ounces . .	Purulent; nummular.
C. V.	20	Ditto.	3	3	None . . .	Formerly copious and purulent.
J. L.	34	Ditto.	3	3	Three ounces . .	Porraceous.

* The figure 1 represents the stage of phthisis preceding softening; 2, that of softening; and 3, that in which vomica is detected.

Let me take this opportunity of calling your attention to two preparations, on the table, of fibrinous moulds, resembling in form the roots of plants, which have been coughed up from the bronchial tubes. One of them is from a middle-aged woman residing in the country, usually enjoying good health, and not presenting any physical signs of pulmonary disease; who, without any preliminary symptoms excepting a sensation of coldness in the chest, has, during the last four years, repeatedly expectorated these branched concretions. I cannot learn that she ever had hæmoptysis. I know little of the history of the other case, but believe that both patients are at present in tolerable health. Examples of this complaint are rather rare, but you will find descriptions of these "bronchial polypi," as they are termed, given by Dr. Warren,* and by Mr. North. They are also figured by Dr. Carswell. Spitting of blood, although not constant in these cases, occurred in the two recorded by Dr. Watson.† Those two patients are stated by Dr. Watson to have occupied chambers warmed by Arnott stoves; but no such stove is used by the countrywoman whose case I have described. I do not think that these bronchial concretions have any relation to phthisis, or that hæmoptysis is a necessary element.

In one of the cases above noticed, Dr. Todd suggested, as a probable explanation, that a chronic and limited inflammation of certain of the bronchial tubes first occurred, not disclosing itself by any marked symptoms,

* Medical Transactions, Vol. I.

† Lectures on the Principles and Practice of Physic. 3d Ed., Vol. II., p. 58.

but leading to the formation of tubular membranes: that after a while these membranes began to be detached; that hemorrhage resulted and continued till the separation was complete; and that at the same time some of the extravasated blood coagulated in the air-tubes, took their shape, and was afterwards expectorated. There is some difficulty in applying this explanation to all the instances in question. Opportunity may occur to me for the further prosecution of this subject; at present I will only propose the inquiry, whether the cause may not be a condition of blood requiring the elimination of fibrine, the direction to the bronchial tubes being sometimes a result of some accidental circumstance, rather than of inflammatory action, the proof of which was certainly wanting in the country-woman, from whom one of the preparations before you was obtained.

In the course of this lecture I have referred to the microscopical examination of the expectorated matter. Some months since I attended a patient in whom the principal symptom was dull sound on percussion, attended with increased vocal thrill as communicated to the hand, over the greater part of the right side of the chest, but without any accompanying symptom adequate to determine the question whether the pulmonary consolidation was the result of inflammation, or of tubercular deposition. Some of the expectoration which presented a flocculent aspect, having been placed under the microscope, exibited the peculiar granular character distinctive of tubercle, as is well represented in the drawing.* In this patient there is no evidence of

* Plate 1.

the existence of vomica, aud the tubercular affection has not made progress. It is therefore reasonable to conclude that the tubercular material is chiefly eliminated on the bronchial surface. Such an instance, however, of information thus derived in the first stage of phthisis is probably rare. In the way of diagnosis, as derived from the sputa, I fear you will not find the microscope aid you much. Now and then the presence in the expectoration of fragments of bronchial tube, or of pulmonary structure may furnish evidence of disorganizing disease. I could indeed give you an instance in which the existence of advanced phthisis was thus detected on the examination of a drop of expectoration sent from a distance, and microscopically examined; but, at this advanced stage of disease, other conclusive signs are usually present, and yet the microscopical testimony may prove insufficient. At any period, unless much practised in such investigations, you may be embarrassed by the great variety of substances combined in the expectorated matter. In a specimen now under the microscope you will find, in addition to pus and mucus globules, chloride of sodium, epithelium from the mouth, muscular fibre, vegetable fibre, and also tartar from the teeth,—the materials of a meal having remained entangled for a considerable time afterwards. Nevertheless the investigation, although limited in its practical utility, opens views of no common interest.

I have already mentioned that, on examining microscopically the expectoration of W. J., I observed a peculiar object resembling a conferva, such as I had never before seen, but not much unlike the torula of

yeast. A reference to the paper of Dr. Hughes Bennett in the fifteenth volume of the Transactions of the Royal Society of Edinburgh, soon convinced me that it was the fungus described and figured by that accomplished physician, and that it was obtained from a phthisical cavity. This example of a vegetable growth in animal structure, tempts me to offer a few passing remarks, for which, if not directly practical, the interest of the subject will be accepted as an excuse. Professor Owen, in a paper on the "Anatomy of the Flamingo," presented the first proof that there are parasitic plants, as well as animals, occasionally attached to animal structures.* In other words, he demonstrated the existence of entophyta as well as of entozoa. In 1835, Signor Bassi, of Lodi, and Signor Bassano, of Milan, described the cryptogamic vegetation called Muscardine, which proves so destructive to the silkworm.† In 1840, M. Des Longchamps obtained a vegetable growth from the aërial cavities of the eider duck; but, previously to this date, namely, in 1839, Schönlein and Rèmak had demonstrated the mycodermata of *tinea favosa*, and Gruby had illustrated the same production.‡ Füchs and Langenbeck, of Gottingen, expressed an opinion that such vegetations exist in every variety of cutaneous scrofula; and Meynier, of Orleans, extended his speculations so far as to assume that warts are fungi of the order gymnospermia, lepra and psoriasis varieties of lichens and mosses, and pulmonary tubercles nothing but varieties of lycoperdon. Such ideas par-

* Philos. Mag. 1833, vol. ii. p. 71, New Series.

† Annales des Sciences Naturelles, vol. viii. p. 229.

‡ See an instructive paper on this subject by Mr. Busk, in the Microscopic Journal for 1841, p. 1845.

take more of poetical fancy than of physiological deduction; still the subject is well deserving of philosophical investigation. These growths do not afford any real countenance to the hypothesis of spontaneous generation. To me the notion of animal structure being converted into germinating plants, appears as absurd as a literal adoption of the ancient fable of Venus springing from the foam of the sea. There is, indeed, no apology for any such wild speculations. The spores of these entophytes may readily be imagined as floating abundantly in the atmosphere, ready to germinate in any nidus suitable for their sustenance, and having its vitality so impaired as to be incapable of resisting their development. There is something to arrest the attention of the contemplative mind in that exuberance of life which can thus find support even in the secretions of decaying structure. We can scarcely, without emotion, recognise in the dark corners of creation such organizations of beauty, reserved, as it were, to reward the inquiries of the zealous student of truth. Gazing on the minute yet beautiful forms thus brought to light, and reflecting on the wonderful arrangements for securing so great a variety of being, I cannot refrain from quoting the explanation of Pliny, whose more limited opportunities filled him with delight by revelations of beauty even in the minute aspects of creation: "In his tam parvis, atque quam nullis, quæ ratio, quanta vis, quam in extricabilis perfectio."* I must not permit myself to expatiate on such a theme; but you will suffer me to congratulate you on the abun-

* C. Plin. Sec. Hist. Nat. lib. xi. cap. 2. Lug. Bavar. 1669.

dant appliances now available for pursuing such investigations, and, above all, on your choice of a profession, which, amidst all its cares and weariness, has so much compensation in the way of incentive and reward, filling the mind with ever-new materials of interest, and raising it to high conceptions, and pious reverence towards the great Author of life.

LECTURE IV.

The pulse: general remarks on the causes of its modifications; average frequency in health; morning and evening pulse—Acceleration in consumption—Effect of posture in health contrasted with effect in disease—Practical illustrations—Speculations regarding the cause.

THE painter, when he would represent a physician, generally depicts him with a finger on his patient's pulse, as though the principal indications of disordered health were thence to be derived; and it must be acknowledged that such an idea has received countenance from some eminent medical writers. If, however, this symptom has been over-rated, we must not on that account fall into the opposite extreme; and a little consideration will make it obvious that any important deviation from the healthy condition of the system can scarcely fail to modify the pulse. The terms of disparagement in which some authors, particularly Heberden, and Falconer, have spoken of the pulse, is, in some instances, attributable to a deficiency of *tactus eruditus*, and a consequent inability to appreciate any of its qualities, excepting those of quickness and slowness. An expression of Celsus, which appears to me to have been misapprehended, has also become so fixed in the medical mind, as imperceptibly to confirm an unreason-

able distrust of this indication. But the remark of Celsus to which I refer,—namely, "Venis enim maxime credimus, fallacissimæ rei,"*—doubtless had special reference to feverish conditions, and was meant to enforce the importance of attending to certain qualifying circumstances, but not to deter from the attempt to derive information from the pulse; otherwise he would not have added, in the same paragraph, that we know "eum non febricitare cujus venæ naturaliter ordinatæ sunt."

The pulse or diastole of an artery is obviously produced by the contraction of the heart; and the quickness, strength, and regularity of the pulse depend on the manner in which the heart fulfils its office. It is chiefly the elasticity of the arteries which prevents a succession of jerks, and renders the flow of the blood uniform, just as the elasticity of the condensed air in the fire-engine causes a continued stream, on the principle that any intermitting motion can be converted into a continued one, by making the original force compress a reservoir or spring which keeps up a constant reaction.

Elasticity, as shown by John Hunter, is most remarkable in the large arteries, while the muscular coat is probably most developed in those of smaller caliber;—an arrangement rendered necessary by the fact, that the conjoined diameter of the small arteries is much greater than that of the large.

It will follow from these observations, that the structure, sympathies, and innervation of the heart and arteries, as well as the modifications of the circulating fluid, are all concerned in giving its character to the

* A. Corn. Celsi Medicinæ, Melligen's Edition. Edinb. 1824, p. 104.

pulse. A full elucidation of this subject would require a treatise rather than a lecture; but these few observations may serve to give a philosophical and consistent character to your investigations in this interesting department of diagnosis.

Let me repeat that the strength of the heart itself, however important, is not the only element concerned in modifying the pulse; the condition of the elastic and of the muscular coat of the arteries will exert great influence, and alterations of the quantity, and perhaps also of the quality of the blood are not inoperative. It may be difficult to determine to what extent these circumstances suffer change in phthisis; but there cannot be a doubt that the disease, when established, is commonly marked by a considerable deviation from the natural condition of the pulse. The quality of pulse which has always attracted most attention is frequency. In a healthy adult male the average number is from 70 to 75 in a minute; in the adult woman from 75 to 80. Let us compare this average with the pulse of some of our patients. Of the men at present under my care in the hospital, the slowest pulses are those of W. G., 84; W. K., 80; P. D., 78; W. U., 72; and in all these cases the indications of phthisis are so slight as only just to warrant an opinion of the disease having commenced; prolonged expiratory murmur, and very slight inequality of movement in the two sides, being all you can detect in W. K., W. U., and P. D.; slight hæmoptysis being also present in W. K. In several cases, in the second or third stage, which I next introduce, you find the pulse respectively, 112, 104, 116, 112, 100. If a man comes to you for medical advice

with a pulse above 90, you may generally suspect phthisis from that symptom alone; for other diseases, when they quicken the pulse in so great a degree, generally disqualify for exertion. Recollect, however, that the pulse may be relatively, when not absolutely quick. Some persons have naturally a pulse remarkably slow. Thus the pulse of Napoleon was only 40 in a minute. Such a pulse, if raised to 60, would be relatively as quick as a pulse of 120 in an individual whose natural pulse is 80; and you should remember that persons of tubercular constitution often have a languid circulation. Among twenty patients in whom the disease has attained the second stage,—that of softening, and whose pulses are registered in the list before you, only one has a pulse below 90. It is Honora D., in whom the cracked-pipkin sound is observable; her pulse is 88. Even this is considerably above the healthy standard, and it may be safely asserted that we have not at present a patient in the second or third stage of phthisis, whose pulse is not considerably accelerated.

Bryan Robinson, and Falconer, asserted that in healthy individuals the pulse is quicker in the evening than in the morning. This, as a general statement, is erroneous. When this circumstance occurs in those who seem to be healthy, you may suspect the peculiar cerebral excitability termed by the Germans *abendfieber* (evening fever.) The valuable observations of Dr. Guy strongly confirm the conclusion of Dr. Knox, that in health, when any difference of frequency between these periods is marked, the morning frequency is greatest; or perhaps it would be more correct to say, that the degree of frequency, under circumstances of quietude,

is the same; but that diet, or other stimulants, produce more effect on the morning than on the evening pulse.

In the first of these respects, the pulse of the phthisical contrasts with that of the healthy individual. From the table before you, it appears that the pulse of our patients is usually quicker in the evening; but you perceive that, as in health, it is less easily accelerated in the evening than in the morning by changes of posture. The respiration is usually quickest, as might be expected, in cases where the amount of pulmonary disorganization is greatest. As yet I have not traced any remarkable difference between the frequency of the morning and evening respirations, nor any rule specially applicable to the phthisical, as respects the relative frequency of the respiration and the pulse.

One of the most interesting circumstances regarding the pulse, viewed as an aid to the diagnosis of phthisis, has reference to the effect of posture on its frequency. Here, again, I avail myself of the exact and laborious investigations of Dr. Guy, who has shown conclusively,* that, if the pulse of a healthy person be felt first as he rests with the back supported in an easy-chair, and then in the standing posture, a marked difference in frequency is observable, the difference increasing in proportion to the natural frequency of the individual's pulse. The healthy difference is shown in the following table of the rate of increase.

Pulse of healthy adult, when sitting	60 ... 80 ... 100 ... 120
Ditto, when standing . . .	66 ... 93 ... 119 ... 147
Rate of increase	6 ... 13 ... 19 ... 27

* Cyclopædia of Anatomy and Physiology, Article Pulse.

Name.	Age.	Disease and Stage.	Pulse in Morning.			Pulse in Evening.			Respiration.		
			Sitting.	Standing.	Difference.	Sitting.	Standing.	Difference.	Sitting.	Standing.	Difference.
WOMEN.											
P. J.	22	Phthisis, 3	92	92	...	96	100	4	24	24	...
E. B.	23	Ditto, 1	80	84	4	124	128	4	...	...	...
M. A. F.	32	(?,) 1	92	116	24	120	120	...	26	24	—2
M. B.	17	Phthisis, 3	100	102	2	100	100	...	22	24	2
S. J. D.	15	Ditto, 3	124	140	16	124	124	...	24	26	2
M. A. M.	16	Ditto, 3	96	104	8	100	108	8	28	28	...
H. D.	35	Ditto, 3	88	100	12	88	88	...	34	32	—2
M. A. G.	29	Ditto, 2	120	120	...	124	124	...	34	34	...
C. H.	41	Ditto, 1	92	108	16	96	92	—4	24	26	2
S. A. B.	18	(?,) 1	88	100	12	22	92	...	44	44	...
M. M.	29	Doubtful.	84	100	16	...	...	...	24	28	...
Mary M.	29	Phthisis, 3	96	104	8	116	120	4	28	28	...
C. V.	20	Ditto, 3	112	116	4	120	128	8	28	28	...
M. B.	26	Ditto, 1	92	92	...	100	100	...	24	28	4
MEN.											
J. L.	34	Phthisis, 3	100	108	8	...	...	...	32	32	...
W. J.	14	Ditto, 2	104	116	12	92	92	...	24	30	6
W. K.	46	Ditto, 1	92	100	8	100	108	8	28	28	...
A. S.	37	Ditto, 2	96	104	8	102	104	2	24	24	...
W. L.	32	Ditto, 1	96	96	...	100	101	1	20	20	...
P. D.	37	Ditto, 1	84	92	8	92	92	...	20	20	...
E. H.	18	Ditto, 3	100	112	12	100	112	12	24	24	...
W. H.	34	Ditto, 1	92	96	4	96	100	4	28	28	...
D. H.	26	Ditto.	88	96	8	92	96	4	18	20	2
C. B.	47	Emphysema.	...	...	...	80	92	12	24	24	...
T. C.	19	Diseased heart.	76	76	...	73	80	7	24	24	...

In the table which I now present, recording the pulse of patients now in the hospital, you see that, with few exceptions, the difference produced by change of posture is comparatively trivial, and that in several instances, especially in the evening, no difference whatever is observed.

The greatest difference is in the morning pulse of M. A. F., in whose case the only indication of phthisis is wavy inspiration at the apex of the left lung. In S. J. D. the morning pulse also contrasts remarkably with the evening pulse.

There are three with a difference, as tested this afternoon, of 12, viz.—C. B., who has emphysema, but no phthisis; S. A. B., in whom the other symptoms are undecided. The third exception is E. H., with a pulse at 100. The healthy difference is about 19: in E. H. the difference is 12, which exceeds the difference in the other consumptive men. This patient's pulse is small and weak, the impulse of the heart imperfect, the first sound too much like the second, and the cardiac dulness on percussion too widely diffused. His heart is apparently thin and dilated, and the question arises whether this peculiarity may account for the fact that the influence of posture is more considerable in him than in consumptive patients generally. In cases of debility change of posture produces so much more effect on the pulse than in the healthy state, that Dr. Knox regarded this indication as a kind of asthenometer. The importance of this fact in connexion with our present subject is obvious; since the debility associated with phthisis might be expected to counteract rather than to produce the inaptitude of the pulse to be modified by changes of posture.

There is an additional circumstance connected with the effect of posture in phthisis which is entitled to consideration. In health, the difference of rapidity of pulse produced by a change from the sitting to the recumbent position, is only about half as much as that produced by the change from standing to sitting; whereas, as far as I have observed in phthisis, the contrary rule appears to obtain. But, not to detain you longer with general statements, let me bring the facts under your immediate observation. If any one of my audience in good health will volunteer, we will examine his pulse. The gentleman who has been kind enough to offer himself, I find, when sitting with the back supported, has a pulse of 74; but in the standing posture, allowing a little time for the effect of locomotion to pass off, it is 92. You will be struck by the close correspondence of this result with the table, which gives 13 as the average increase of beats produced by standing, on a pulse which is 80 when in the sitting posture.

Let us contrast with this result the pulse of some of our patients. Here is one, M. A. G. Place your hand alternately under the right and the left shoulder-blade as she speaks. You observe how much more of vocal vibration is communicated to the hand on the right side than on the left. Listen to the breathing. You find each inspiration on the upper half of the right chest in front accompanied with two or three peculiar clicks. This is a characteristic sign of tubercular affection in the second stage. Try her pulse while sitting: it is 124; on standing up, it is still 124.

Here is another patient, P. J., her pulse when sitting is 96; on standing it is 100, rising only 4 beats. Try

whether the state of chest is such as the rule which I am illustrating would require. There is dull percussion over the summit of each lung. On the left, under the acromial end of the clavicle, you find a bellows sound synchronous with the heart's contraction; at the sternal end a rubbing sound, produced probably by intercurrent pleurisy. Over the apex of the right lung you hear cavernous voice and respiration. There is some anæmia, and the pressure of tubercular lungs, under such circumstances, does sometimes, as in this patient, induce a bellows murmur probably by superadding a disturbing cause to that induced by impoverishment of blood on the even current of the circulation. Supposing a person in health to have a pulse of 96, it should rise about 18 beats on standing; if anæmia were present the change should be still greater; but in the case before you the difference, you observe, is only 4 beats.

Let us examine one or two men, remembering that in males the healthy difference produced by change of posture is greater than in women. In this man, W. H., you may hear gurgling at the apex of the right lung when he coughs, proving conclusively the presence of vomica. In making percussion, I think you will be conscious of remarkable diminution of the natural elasticity. In placing my hand on the chest as he speaks, I have an impression that the vocal vibration is less felt than on the comparatively healthy side. If so, it is an exception to the general rule, which would lead you to expect increased vibration through tubercular lung; and this exception would be explained, if, as I suspect, the tubercular deposition is in this case unusually diffused, and the bronchial tubes are extensively

obliterated. This patient's pulse is 100 when standing, and 96 when sitting; but the difference on lying down, when it sinks to 88, is remarkable, and in accordance with the rule which I have offered.

Look at one more patient, D. H. I may tell you that his spirometer number is very low, but you see from his general aspect, his long eyelashes, his gums margined in a way I may more fully describe to you in some future lecture, what you may expect. Under the left clavicle you hear the clicking rhonchus of softened tubercle. His pulse, when sitting, is 92; when standing, 96.

Examine, by way of contrast, the pulse of T. C.; when standing, it is 80; when sitting, even without supporting the back, it soon goes down to 73. The reason is clear to you. This is a patient whom you have formerly examined, and in whom you have detected cardiac disease and pleuritic contraction, but no phthisis.

These instances, taken as it were at random, may suffice to illustrate an obvious and interesting symptom of the disease. The explanation is not so easy. Is it that the heart, accustomed to a continuous cause of irritation, is less influenced by the trivial excitement which changes of posture might otherwise induce? or is there atrophy of the muscular coat of the arteries, and consequently less variety in the degree of influence exercised by this structure on the centre of the circulation? There is one analogy which may suggest a particular line of inquiry, and which is furnished by the fact, particularly observed by Dr. Graves, that the pulse of persons affected with hypertrophy of the heart is

remarkably little influenced in its frequency by change of posture. Is the relative weight of the heart to the body generally greater in phthisis than in other diseases? The late Dr. Clendinning investigated this question with much care, and determined it in the affirmative.

The book of post-mortem observations now before you supplies some materials towards the settlement of this question. It records the weights of the hearts of twenty-three men and of nine women. On adding the weights of the former, and dividing by twenty-three, I get eight ounces and nine-tenths:—on adding those of the latter, and dividing by nine, I obtain a result of eight ounces and a third; in both instances, above the average of the healthy heart, and yet many of these subjects were very much emaciated. Should further observations be in harmony with these calculations, there would be so far an analogy between the heart in phthisis and the heart in a state of slight hypertrophy. The fact that the pulse of women and children is less affected by change of posture than that of males and adults, affords countenance to the idea that the condition of the muscular coat has an influence in the phenomenon so characteristic of phthisis; while the remarkably slight effect produced by emotion on the frequency of the phthisical pulse lends support to the hypothesis, which would assign as an explanation the pre-occupation of the heart by other sources of irritation. The three particulars at which we have glanced may possibly combine their influence, or it may be that the cause has yet to be sought, but of the fact I do not think any substantial doubt can be entertained. If

you compare the pulse of a consumptive patient on different days, you will often find that its variations in frequency are more considerable than can be readily explained; but on the days when the pulse is least frequent, you will usually find the difference produced by change of posture to be greatest. Whatever discrepancies may be remarked, you will commonly perceive a want of harmony with the rule which obtains in health, and often rendered more apparent on taking the mean of several observations. When tubercular deposit exists in the lungs, it is doubtful whether the pulse, under any improvement of general health, ever regains its sensitiveness to change of posture; but when the tubercular element has not become localized, I have reason to think that the pulse, if the constitutional condition be ameliorated, may to a considerable extent recover the disposition to vary, from the cause which we are now considering. The hints which I have given in this lecture may encourage you to expect considerable aid in diagnosis, and prognosis, from a careful examination of the pulse. In this, as in most things, there are two extremes to be avoided. You know that the Chinese physicians were long accustomed to form their diagnosis from the pulse alone, and often without even seeing the countenance of their patients.

Dr. Rucco, in a voluminous work on the subject of the pulse,* gives instances in which he predicted the sex of the fœtus in utero from the maternal pulse. "We examined," he says, "the pulse of the lady of the Signor Raffaelli, of Naples, and after repeated observa-

* Introduction to the Science of the Pulse. London, 1827, vol. ii. p. 248—421.

tions predicted that she would give birth to a male. To this opinion we were led by the difference we observed between the right and left uterine pulse. The first sensibly manifested its organic character, the latter not at all." Dr. Rucco states that "the prediction was verified by the event," and proceeds to give other instances, which need not be here adduced; but you may be interested to hear an example in which this physician considers that he detected the influence of a special mental emotion in modifying the pulse. "About three years since, the jaundice attacked a man of letters in consequence of a violent attachment to a young lady, whose parents would not consent to their union. The patient's pulse was low, concentrated, thin, tense, unequal. A small eminence arose between the index and middle fingers, and its smallness and concentration increased at the time the melancholy was deepest, so that it was clear, from the presence of the organic character of the hepatic pulse, that the action of the disappointment or negative he had received had made a morbose impression upon the vitality of the liver."

You smile, not without reason, at the seeming pretension of this statement; but I would nevertheless advise you to refer to the works of such authors as Rucco, and compare their opinions with your own observations, and I am mistaken if you do not find that there is much to be ascertained from certain changes of character in the pulse, not susceptible of exact verbal description. Such conditions will aid you in judging of the vital energy in diseases, the issue of which may depend more on constitutional peculiarities than on organic change. Independently of the lessened influence

of posture, to which it has been one of the objects of this lecture to call your attention, let me repeat that, as a general rule, unnatural quickness of pulse sets in, often at a very early period, in phthisis, and increases with the progress of the disease; that the earlier it is manifested the more, other things being equal, you would apprehend speedy aggravation, but that on the other hand a steady and gradual reduction of the frequency of the pulse would lead you to entertain hopes of important amendment, for under the influence of successful treatment the pulse loses its irritable character and becomes calmer, slower, and fuller. Whilst you will take care not rashly and hastily to pronounce a diagnosis from the state of the pulse alone, you will nevertheless rarely fail to derive considerable assistance from a sagacious regard to its condition.

LECTURE V.

Cod-liver oil—Superiority to any other single remedy in phthisis; Illustrative instances of its value—Different kinds compared—Collateral remedies sometimes useful, often unnecessary—Effect of its introduction into the system by friction—Mode of action—Important practical generalizations derivable from a knowledge of its mode of action—The appreciation and use of facts.

THE great object, gentlemen, of all our researches is to attain to the successful treatment of disease. With this conviction, I propose to devote the present lecture to the consideration of the effects of a remedy which you will have observed is very largely employed at this hospital, even to the extent of more than 600 gallons annually.

The records of the hospital give you an opportunity of comparing the effect of treatment conducted on general principles, irrespective of the use of this remedy, with treatment in which its administration has occupied an important place; and the more carefully you institute the comparison, the more you will be convinced of the value of this medicine in the treatment of phthisis, when appropriately administered, and combined with the use of such other measures as any special circumstances in the individual patient may require.

But you will like to see examples of its use. I first introduce M. A. F., a female aged thirty-two years. The expansion of the two sides of her chest at the upper part is not perfectly equal, although a practised eye may be required to detect the difference; in the left subclavicular region inspiration is interrupted; in the right subclavicular region the expiratory murmur is prolonged. The disease is in a very early stage, and cod-liver oil has been given in the hope of improving her strength, and thus warding off further disease. Her progress is encouraging; the pulse, during the last six weeks, having gone down from 116 to 80, and her weight increased five pounds.

The next patient, A. S., is a tailor, who has suffered much from confinement in close workshops. The principal physical signs at the time of his admission were, dulness on percussion, and extensive moist crepitation (clicking) over the upper half of the left chest. Softening of tubercular deposit was obviously proceeding rapidly, and this is the period in phthisis when the influence of remedies is usually least satisfactory. The patient looks very delicate. The pulse has remained about 100 for the last seven weeks, notwithstanding the administration of the cod-liver oil, and his general aspect is unpromising; still, some good effect has been produced, and there is an addition of five pounds to his weight.

The next patient, L. D., a young woman aged twenty-one, came into the hospital on the 31st of October, with moist crepitation at the apex of the right lung, and gurgling in respiration and cough on the left; phthisis existing in the second stage on one side,

and in the third stage on the other. The pulse, as in the previous patient, remains as yet unaltered, but there is an improvement of strength, a subsidence of night perspirations, a regular state of bowels, which were previously relaxed, and, after the three months of her use of the oil, an increase of weight to the extent of six pounds. The local signs also indicate amendment. The expectoration is much diminished, and a dry, blowing respiration has taken the place of gurgling.

E. M., the patient now before you, under the judicious care of my colleague, Dr. Cursham, has acquired so ruddy a complexion that you would not suppose her an invalid, although there is cavernous respiration at the apex of one lung. Still, the cough is subdued; the expectoration, previously profuse, has ceased, and she has gained no less than fifteen pounds weight in about twelve weeks. It is right to mention that she has had spermaceti mixture, and compound hemlock-pill for her cough; and of late, in addition to cod-liver oil, an ounce twice a day of the following mixture: twenty-four grains of ammonio-citrate of iron; two drachms of spirit of nutmeg; six ounces of infusion of calumba.

Here is another patient, S. G., aged twenty-five, who is fattening, and the catamenia, long interrupted, have returned,—a circumstance of great significance and promise. You find a little cavernulous rhonchus only, where there was formerly extensive gurgling: and a marked flattening in the subclavicular region indicates the process of contraction in a cavity. Her weight, which was seven stone thirteen pounds on her admission, in July, has steadily increased; and now, at the end of February, it is nine stone, two pounds, and the concurrent symptoms of vomiting, palpitation, and

œdema, with which this patient was for a time harassed, have entirely disappeared. In addition to cod oil, she has had syrup of iodide of iron, and counter-irritation has occasionally been established by the application of a liniment made according to the following prescription: Take of iodine, and of iodide of potassium, each an ounce; of rectified spirit, two ounces; mix.

I must have the satisfaction of introducing one more patient, whose case is highly gratifying. This young woman, M. B., is, I am informed, the only remaining member of a large family, all of whom have died of phthisis. She was admitted five months since, with dull percussion at the right apex; at the left, gurgling in respiration, and cough. Her case was examined and recorded by two other medical gentlemen before I explored her chest, and my account corresponded with theirs as to the existence of cavity in the left side. To-day two of my colleagues have examined her, and agree with me in the opinion that no sign of cavity can now be detected in that situation. Let me describe the progress of her improvement: the extent of the gurgling gradually lessened, then dry cavernous respiration was the principal sign; this was superseded by blowing, and then bronchial breathing, and at present I detect nothing wrong except a little flattening of contour, slight dulness on percussion, and wavy inspiration. The catamenia have returned; the pulse has sunk from 112 to 80. Her weight five months since was seven stone twelve pounds and a quarter; we will try it again: it is now nine stone five pounds and a quarter.* It will be observed that this patient

* This patient continues, at the present time (August, 1853,) in a state of apparent health.

gained twenty-one pounds in weight during the space of twenty-one weeks; and it is worthy of notice, that the quantity of cod-liver oil administered during that time was considerably less than three pints; a fact strongly opposed to the opinion that the oil is useful only in the way of nutritive material. Our usual plan is to give one or two drachms twice a day at first, gradually increasing the quantity to half an ounce three times a day, and I have seldom found any advantage accrue from going beyond this limit. Dr. Pollock has informed me of some experiments made at his suggestion on the fattening power of coarse cod-liver oil on pigs and oxen, from which it resulted that two ounces daily was the best quantity for pigs; four ounces for oxen. It was ascertained from butchers, unacquainted with the experiments, that when more than two ounces had been given to pigs, the flesh of the animals was objected to, as having a disagreeable flavour.

You may wish to form an opinion regarding the comparative efficacy of the different kinds of cod-liver oil. In my early trials of the remedy, six years since, forty or fifty cases were treated with the coarse kind, resembling what is used in preparing leather, and the average benefit derived did not materially differ from that effected by the purest varieties subsequently employed. At a later period I had the curiosity to try these different kinds, combined with liquor potassæ and peppermint oil, giving alternately the coarse and the purified cod oil, and recording the report of the patients; and it is a curious fact, that the majority actually gave the preference to the mixtures in which the coarser oil was introduced. Objections have been made to this

combination, as complicating the treatment with the addition of a medicine by some persons supposed to be inappropriate; but my experience is favourable to the use of liquor potassæ, especially in the early stage of phthisis, and theoretical arguments might be advanced in its favour. In scrofulous affections, if Dr. Hughes Bennett be correct in his hypothesis, there is probably undue acidity of stomach, unfavourable to the solution of albuminous materials. The alkali of the salivary and pancreatic fluids, being neutralized, fails to fulfil its proper office. The lungs, not having enough carbon to excrete, local congestions arise; the blood is overcharged with albumen, and the albuminous exudation being deficient in fat, elementary molecules are not formed so as to constitute nuclei capable of development into cells, and tubercular corpuscles are the natural result.

Cod-liver oil probably tends to obviate the series of derangements thus described, by combining with the albuminous element of chyme, so as to form the healthy chyle-granules which feed the blood; and, for the reason above named, is probably more advantageously introduced in scrofulous subjects when combined with an alkali. It is a curious fact that when, about 75 years since, cod-liver oil was largely used at the Manchester Infirmary, chiefly in the treatment of rheumatism, the medicine was ordinarily given combined with alkali; Dr. Percival's favourite prescription being twelve minims of soap lixivium, an ounce of cod-liver oil, and half an ounce of peppermint water. The practice of administering a little lemon-juice afterwards would not necessarily interfere with the action of the alkali; and is

worthy of incidental notice in connexion with the recent valuable suggestions of Dr. G. O. Rees on the treatment of rheumatism with the juice of lemons. Occasionally, although not frequently, the stomach rebels against the oil however purified, and in whatever combination; and I have been accustomed in consequence, under such circumstances, to introduce the oil endermically.

Three years since I was requested to see a gentleman from the country, confined to his bed, emaciated, hectic, and apparently failing rapidly, with a cavity at the apex of the right lung. There was considerable diarrhœa; and thinking the internal use of cod oil unseasonable, I ordered an ounce, combined with oil of lavender, to be rubbed into the chest night and morning. This gentleman gradually rallied, and returned to the country, where he advanced much in strength and weight, and rode about on horseback. I examined him last year, and, judging from the physical signs, found the size of the cavity materially reduced.

J. S., a female patient under my care for the last two years, with softened tubercle in the left lung, notwithstanding the adoption of a tonic regimen, and the internal administration of cod oil, got gradually worse, and in four months preceding August, 1850, her weight was reduced from 105 pounds to 97. I then prescribed, as a liniment, three ounces of cod oil; an ounce of aromatic spirit of ammonia; half a drachm of oil of lavender; and five grains of opium; half to be rubbed in night and morning. In a fortnight improvement commenced, and in two months her weight had increased to 104 pounds.

M. A. W., a patient lately in the hospital, with cavernous respiration at the summits of both lungs, and who

for twelve weeks had lost on an average a pound in weight every week, rallied, gained a little weight during the first month of using the same liniment, and left the hospital somewhat improved. But I will not multiply examples. It is enough to say that satisfactory results have been sufficiently frequent to authorize the measure, sometimes as an auxiliary to the internal use of the oil, but more especially as a substitute, when the stomach revolts at its internal administration.

I am indebted to Dr. Glover, of Newcastle, for a reference to some observations of Dr. Klencke, of Brunswick, confirmatory of the results just described. In a memoir on the Therapeutical History of Cod Oil, Dr. Klencke says,—"I shaved some young dogs, and rubbed them with cod-liver oil twice daily for three weeks. At the end of this period they were in as good condition as dogs to whom oil had been internally administered; their bile was found as rich in fat, and their chyle equally charged with corpuscles without nuclei." Klencke adds, that similar changes were observed in the bile and chyle of a cat bathed twice a day for some time in the same remedy, and that some oil was discovered in the urine of the animal, proving its free absorption by the skin.

You will naturally ask me whether there are any disadvantages incident to the use of so valuable a remedy; and you may repeat questions which I have occasionally heard: Does it often produce diarrhœa? Does it tend to increase hæmoptysis? As respects the latter question, it might be sufficient to mention that the average frequency of the occurrence of hæmoptysis, as recorded by Louis and other observers, was fully as great in phthisical cases before cod-liver oil was introduced, as it

has proved in those cases, statistically reported in the hospital, in which this remedy has been perseveringly used. When hæmoptysis is active, as characterized by phenomena described in my second lecture, it is indeed easy to imagine that a remedy which increases the fulness of the pulse might aggravate the spitting of blood; under such circumstances the fish oil should be discontinued, and the removal of blood by cupping may be desirable. When, however, as is frequently the case, the hemorrhage is passive, means which tend to enrich the blood are calculated to lessen the hemorrhagic tendency, and its occurrence is by no means an adequate reason for the discontinuance of the oil.

As respects diarrhœa, a malady which the remedy under consideration has been supposed occasionally to aggravate, my own impression is that no such influence is evinced, unless a state of erethism of the mucous membrane is present, in which case measures should be used to obviate such condition prior to the administration of the oil. Many of the patients take the oil unmixed, or, when such combinations are appropriate, floated on nitro-muriatic acid mixture, or on lemon-juice, or in a saline draught during effervescence. The addition of creasote sometimes renders the stomach more tolerant of the remedy.

An ounce and a half of cod-liver oil, four drops of creasote, two drachms of compound tragacanth powder, and four ounces and a half of aniseed water, form a suitable mixture, of which an ounce may be taken thrice daily.

The following table exhibits the results of treatment in all those of my hospital patients who are at present under the course of cod-liver oil.

Name.	Age.	Disease and stage.	Date of Admission.	Time of commencing the Oil.	Successive Weights.	PULSE.		BOWELS.	
						Before taking the Oil.	At present.	Before taking the Oil.	At present.
					st. lbs.				
					Nov. 13, - 9 7				
					" 20, - 9 5				
					Dec. 4, - 9 2				
					" 18, - 9 1				
W. H.*	34	Phthisis, 2	Nov. 11.	Dec. 17.	Jan. 2, - 9 2¾	70	100	Confined.	Confined.
					" 22, - 9 6¼				
					Feb. 5, - 9 6¾				
					" 14, - 9 10				
					Dec. 18, - 6 11				
A. S.	37	Ditto, 2	Dec. 16.	Dec. 20.	Jan. 2, - 6 13	100	100	Regular.	Regular.
					" 22, - 7 1				
					Feb. 14, - 7 2				
D. H.	26	Ditto, 1	Feb. 4.	Feb. 4.	Feb. 5, - 10 0¾	—	100	Confined.	Confined.
					" 14, - 10 1¼				
					Jan. 2, - 7 13				
T. C.	19	Doubtful.	Dec. 23.	Dec. 28.	" 22, - 8 6¾	88	80	Regular.	Regular.
					Feb. 5, - 8 7¾				
					" 14, - 8 8¾				
					Jan. 4, - 7 3¼				
M. A. F.	32	Phthisis, 1	Dec. 23.	Dec. 25.	" 23, - 7 4¾	116	80	Confined.	Confined.
					Feb. 15, - 7 8¼				

* On the 17th of March this patient weighed ten stone; the gradual loss of weight prior to the administration of the oil is worthy of notice.

Name.	Age.	Disease and stage.	Date of Admission.	Time of commencing the Oil.	Successive Weights.	PULSE.		BOWELS.	
						Before taking the Oil.	At present.	Before taking the Oil.	At present.
					st. lbs.				
					Sept. 17, - 7 12½				
					Oct. 21, - 8 2½				
					Nov. 13, - 8 7¾				
M. B.	17	Phthisis, 3	Sept. 16.	Sept. 17.	" 27, - 8 10	112	80		
					Dec. 14, - 8 12½				
					Jan. 4, - 9 0				
					" 23, - 9 1¼				
					Feb. 15, - 9 5¼				
					Nov. 13, - 5 4½				
					" 27, - 5 6¾				
S. A. M.	16	Ditto, 3	Oct. 28.	Oct. 28.	Dec. 14, - 5 5½	98	100	Relaxed.	Confined.
					Jan. 4, - 5 4¼				
					" 23, - 5 5¾				
					Feb. 15, - 5 8½				
					Nov. 13, - 7 7½				
					" 27, - 7 10				
L. D.	21	Ditto, 3	Oct. 31.	Oct. 31.	Dec. 14, - 7 12¾	100	100	Relaxed.	Regular.
					" 23, - 7 7¾				
					Feb. 15, - 7 13				

Those who take the oil unmixed, may cover the taste by eating dried orange peel, or by introducing a little table salt into the mouth before and after the oil.

I occasionally administer the oil with infusion of walnut leaves, which proves an agreeable vehicle, and I think also possessed of medicinal properties, which render it an auxiliary in the treatment.

You will observe from the cases tabulated in the preceding pages, all of which you have had an opportunity of seeing,—and the conclusion is in harmony with more extended observations,—that, if the use of cod oil has any influence on the condition of the bowels, its influence is rather astringent than laxative.

I believe the fact to be, that this medicine has no direct influence on the intestinal action; but that by improving the general health it tends indirectly to restore a natural condition of the bowels, while it expands the pulse, lessens the expectoration, moderates the night perspirations, and in many instances supersedes the necessity for the use of any other remedy.

You will perhaps say that the evidence adduced of the powers of cod oil is strong, but that the remedy was formerly highly esteemed and yet fell into disuse; and you may anticipate that, under the fluctuations of fashion, it will again sink into oblivion. The best way to secure for any remedy its proper place in therapeutics, is to determine its mode of action; and, with this view, I have from time to time endeavoured to obtain an analysis of the blood of patients who were in the course of improvement under its use. As an example, let me show you the analysis of the blood of a phthisical man in the Le Blanc ward, who had gained four-

teen pounds weight in three months, and had essentially improved under the cod oil treatment.

Dr. Snow did me the favour to make the analysis. I place by its side, for comparison, the analysis of the blood of a healthy male, as given by Becquerel and Rodier.

Analysis of the blood of a healthy male.			Ditto of a phthisical man after three months' treatment with cod oil.
Water	779·0		770·6
Blood-globules	141·1		143·5
Albumen	69·4		
Extractive and salts	6·8	76·2	81·5
Fibrine	2·2		4·0
Fatty matters	1·6		0·4

The interest of these analyses is increased by their harmony with the observations of Simon, who has recorded an increase of blood-corpuscles, and a diminution of fibrine, under the use of cod oil; and their importance becomes more obvious when they are viewed in reference to the facts stated by Andral and Gavarret, who, having analyzed the blood in twenty-one cases of phthisis, found their maximum amount of fibrine, 5·9, their minimum 2·1, and that the amount of corpuscles approximated to the normal standard in only two instances, in which it was represented by 122·1 and 120·4. Frequently indeed the amount was below 100; and the decrease of corpuscles was almost always accompanied with a corresponding increase of fibrine.*

You see that, in the patient just referred to, the proportion of blood-corpuscles pretty closely corresponds with that characteristic of health; and Mr. Rogers re-

* Simon's Animal Chemistry, Sydenham Soc. Edit., vol. i. p. 281.

ports a similar result from the examination of the blood of some other patients to whom we have given the oil. As far as I am aware, however, chemical observations lead to the conclusion, that in phthisis a deficient proportion of blood-corpuscles is the usual peculiarity. Struck with this circumstance, I took pains to collect, chiefly from Simon, analyses of the blood in different diseases, and I have placed before you averages of the proportion of blood-corpuscles and albumen in certain diseases, with a view to compare them with phthisis.

AVERAGE PROPORTION OF SOME CONSTITUENTS OF BLOOD.

	Albumen.	Corpuscles.
In health	76	130
Pneumonia	80	122
Phthisis	100	78
Rheumatism	100	74
Diabetes	105	80
Bright's disease	103	50
Chlorosis	72	56
Carcinoma	45	55
Erysipelas	—	100

You will observe that there are two diseases which present a singular similarity to phthisis, in their proportions of albumen, and of corpuscles. These are rheumatism, and diabetes. Now it is a remarkable fact, that rheumatism is the malady for the treatment of which cod-liver oil was first introduced into this country and for which it has been so largely and successfully employed elsewhere. The variety of rheumatism in which it was most effectual is that in which the impoverished condition of blood is most likely to occur.

Dr. Percival,* half a century since, observes,—"Men and women advanced in years, whose fibres may be supposed to have acquired a degree of rigidity, find surprising effects from it (cod oil.) Some who have been cripples for many years, and not able to move from their seats, have after a few weeks' use of it been able to go with the assistance of a stick, and, by a longer continuance, have enjoyed the pleasing satisfaction of being restored to the natural use of their limbs which for a long time before had been a burden to them. Two cases lately occurred in which the oil had an extraordinary effect, even on young persons whose ages did not exceed ten years. Guaiacum, calomel, blisters, &c., were tried on both these patients, but with so little benefit that opiates were given merely to procure temporary relief. Their lower limbs seemed to be a burden to them, and they had such an appearance of distortion that no hopes of relief could be well entertained. In compliance with the particular request of their parents, the cod oil was given. The one obtained a perfect cure, the other nearly so; the latter having a little distortion in his back, is prevented the use of his legs. So general (adds Dr. Percival) has been the use of the oil with us, that we dispense fifty or sixty gallons annually; and the good effects of it are so well known amongst the poorer sort, that it is particularly requested by them for almost every lameness. Except bark, opium, and mercury, I believe no medicine in the materia medica is likely to be of more service, and I should wish for a more general use of it, in order to prove that

* Dr. Thomas Percival; Works, Literary, Moral, and Medical, vol. iv. p. 354.

the above account of its good effect is no exaggeration."

I am strongly impressed with the value of the remedy in diabetes. It is true that this disease involves an additional element, which it is not easy to suppose amenable to such a remedy as fish oils, but the benefit derived in many respects is often remarkable.

In the month of April, 1848, a patient came under my care who had been affected with diabetes for some months, and had taken creasote and other medicines with little advantage. At the time I first saw her, the quantity of urine passed in twenty-four hours amounted to ten pints.

The following table will show her progress under the cod-liver oil treatment.

Dates.	Remedies.	Urine.	
		Quantity.	Specific Gravity.
1848.			
April 1	Cod oil, two drachms three times a day.	Ten pints.	
" 13	Ditto.	Six pints.	
" 20	Ditto.	Four pints.	1.040
" 27	Cod oil, four times daily.	Six pints.	1.042
May 4	" five times daily.	Three pints.	1.042
" 11	Ditto.	Three pints.	1.037
" 18	Ditto.	Two pints and a quarter.	1·020

This patient afterwards passed unavoidably under other care; and, owing to a misunderstanding, did not resume the cod-liver oil, which had been from temporary causes intermitted. She took a variety of remedies, including sulphur, hydrochloric acid, opium, and alkalies. Drachm doses of carbonate of soda for

a time acted favourably, but on the whole she retrograded. Her weight, which in June, 1848, was 107 pounds, had fallen, by December, 1849, to 88 pounds. Her appearance was haggard, and there was threatening of pulmonary disease. The cod oil was resumed, and even then with temporary advantage, but she ultimately relapsed and sank.

The theory which I have now proposed in explanation of one mode of action of the oil, namely, through an influence exerted on the proportion of red corpuscles, is in harmony with the fact that its good effects are specially produced in women, and children; for in them the relative proportion of corpuscles is stated by chemists to be small.

I may add that the remedy has afforded me most satisfactory results in neuralgia and sciatica, when those complaints were associated with anæmia. Whenever arterial or venous murmurs indicate such a condition, a rapid improvement may be expected to follow the administration of the oil, even without the assistance of ferruginous medicines. In some disturbed manifestations of the nervous system, which seem to be more moral than physical, the presence of a weak, small pulse, has sometimes led me to give the oil, and with signal success. Do not think that I dwell on this subject from any love of fanciful hypotheses. When the light issuing from a certain number of facts seems to converge towards a particular point of explanation, it is useful to try the applicability of that explanation to analogous facts, and thus to entertain, I do not say to adopt, a sort of tentative theory, or "*prudens quæstio.*" If the theory prove universally applicable, we

obtain a law; if the explanation be found incorrect, it is yet seldom fruitless: indeed the proof of its inadequacy serves to narrow the field of inquiry, and to increase the probability that the next step towards the attainment of truth may be in the right direction. Time is sometimes lost in the laborious accumulation of miscellaneous facts. Numerism is productive only by the proportion of sagacity or intellectual intuition, —applied in the selection and appreciation of facts. There is an aristocracy in facts as well as in races, and the mind should be taught to discern their prerogative dignity. "The naturalist who cannot or will not see that one fact is often worth a thousand, as including them all in itself, and that it first makes all the other facts;—who has not the head to comprehend, or the soul to reverence a central experiment or observation (what the Greeks would perhaps have called a protophænomenon,) will never receive an auspicious answer from the oracle of nature."*

To apply these observations to our immediate subject, let me remark that changes produced on the blood by diseases, or remedies, may fairly be placed amongst cardinal facts. It can scarcely be doubted that if a professor accomplished in chemistry were officially connected with every hospital, such facts might be so collected, and collated, as to render the discoveries of this important science available in a remarkable degree for the advancement of practical medicine.

Should further observation confirm what has been suggested in this lecture regarding the influence of fish

*H. N. Coleridge. "The Friend," vol. iii. p. 156. London, 1844.

oils on the composition of the circulating fluid, we shall discover something more than the reason of their usefulness in phthisis; we shall show that they have no exclusive adaptation to that disease, but may be given with equal prospect of benefit in various diseases associated with analogous conditions of the blood; and thus we may come to establish a therapeutical law so widely applicable as to simplify our principles, extend our resources, and consolidate our system of practical medicine. Such a generalization would commend itself to my mind by its freedom from complication and obscurity; for I am sure you will agree with me concerning the evidence afforded by some of the noblest triumphs of philosophy, that, although shallowness and obscurity are continually associated, the ocean of truth is clear as well as deep; and that, in proportion as we approach to science, we shall attain to simplicity.

LECTURE VI.

Substitutes for cod-liver oil—Inquiry regarding the relative value of different elements of the oil; carbon, bile, olein—Vegetable oils—Medical use of cold-blooded animals; turtle, viper—Animal oils—Instances of good effects from neat's-foot oil; sperm oil; lard oil—Advantage of adding phosphorus to vegetable oil—The long-continued use of oil often necessary to successful treatment—Properties of cocoa-nut oil.

At our last lecture, gentlemen, I submitted to your observation all the hospital patients at present under my care, who have for any considerable time taken cod-liver oil. They have all, though in different degrees, experienced benefit from its use; and you have been supplied with evidence of the reasonableness of the confidence now becoming so widely diffused in its virtues. As I proceed to-day, you will perceive the reason why, just at present, there are fewer of my patients than usual on the cod oil treatment. I was anxious to give you an opportunity of forming an opinion regarding the comparative value of some other medicines which are, perhaps, analogous to this fashionable remedy in their properties. In determining on the direction in which such experiments should be made, we should first inquire on what property the virtues of the cod-liver oil depend. Let me therefore, call your attention to its analysis.

ANALYSES OF THREE KINDS OF COD-LIVER OIL BY DE JONGH.

	Brown.	Light Brown.	Pale.
Oleic acid, with brown substance (gaduine and two peculiar bodies)	69·78500	71·75700	74·03300
Margaric acid	16·14500	15·42100	11·75700
Glycerine	9·71100	9·07300	10·17700
Butyric acid	0·15375	... ...	0·07436
Acetic acid	0·12506	... ...	0 04571
Fellic and choleic acids with some oleine, margarine, and bili fulvin	0·29900	0·06200	0·04500
Bili fulvin and bili-fellinic acid, and two peculiar substances	0·87600	0·44500	0·26800
A peculiar substance, soluble in alcohol of 30°	0·03800	0·01300	0·00600
A peculiar substance insoluble in water, alcohol, and ether	0·00500	0 00200	0·00100
Iodine	0·02950	0·04060	0·03740
Chlorine, with some bromine	0·08400	0·15880	0·14880
Phosphoric acid	0·05365	0·07890	0·09135
Sulphuric acid	0·01010	0·08595	0·07100
Phosphorus	0·00754	0·01136	0·02125
Lime	0·08170	0·16780	0·15150
Magnesia	0·00380	0·01230	0·00880
Soda	0·01790	0·06810	0·05540
Iron	a trace		
Loss	2·56900	2·60319	3·00943
Total	100·00000	100·00000	100·00000

The chemical hypothesis, which would attribute the efficacy of the remedy to the supply of carbon thus afforded for consumption in the lungs, induced me some years since to try the effect of animal charcoal, administered in doses of fifteen or twenty grains twice or thrice daily. As might have been expected, no advantage was gained, either as respects the local or constitutional symptoms, with the exception of one circumstance of some interest,—namely the occasional relief of concur-

rent diarrhœa. This result is in harmony with the observations of Dr. Garrod, on the power of animal charcoal to separate acrid substances from their solutions.* The chemical theory above noticed has suggested the administration of carbon in another form, in which indeed one might expect it to be more readily assimilated,—that is by means of large doses of syrup. I have not heard of any remarkable advantages derived from this expedient; and, if my views regarding the remedy be correct, such advantages are not to be expected. If the virtue of the remedy we have been considering be due to the presence of oleine, vegetable oils should exert similar efficacy; and I formerly administered olive oil and almond oil to a considerable number of patients with some hope of advantage. I was, however, completely disappointed. The olive oil frequently produced nausea; and I never observed any decided increase of weight, or amelioration of symptoms, which could be distinctly attributed to its use. Almond oil is less apt to nauseate, and agrees generally better than olive oil, but I could not trace any remedial effect from its use; and am inclined to believe that these oils have no important influence, and can only be regarded as sheathing the mucous membrane. An occasional discrepancy in the results of such experiments may be attributable to the use of lard oil, in the adulteration of vegetable oils. For lard oil, although of all the animal oils probably the least curative, appears, judging from the few experiments which I have made with it, to possess properties more analogous than the vegetable oils exhibit to that obtained from the liver of the cod. Those practitioners

* "Memoirs of the Medical Society of London." New Series.

who have spoken with most confidence of the merits of vegetable oils have combined them with iodide of potassium, and these oils may not be an unsuitable vehicle for this remedy, which possesses unquestionable efficacy in many forms of scrofula; but cod oil has virtues not to be confounded with those of iodine, and produces its best effects in cases where iodine is scarcely admissible. It is, moreover, worthy of consideration, that the comparative efficiency of the different varieties of cod-liver oil is not found to have any relation to the proportionate quantities of iodine which they contain. It has been supposed that the biliary elements incorporated with the oils obtained from fish livers promote their efficacy; but I have not been able to discover any beneficial results from the addition of ox-gall to oils not obtained from the liver, although it is fair to acknowledge that I have not pursued this experiment to any great extent.

In proceeding to place before you examples of the effect of other analogous remedies, it is my impression that you will be led to agree with me that fish oils generally resemble one another in medical properties. Popular observation is favourable to this opinion. In the Scotch Highlands, a broth made by decoction of the common ray has long been used with advantage in the treatment of rickets. Other animal oils besides those obtained from fish have enjoyed a popular reputation. In South America, remedial efficacy is attributed to the oil of the condor, and in the backwoods of the United States to that of the rattlesnake; and it may not be inappropriate to mention that I have been favoured with a present of oil of scorpions, as it is

termed, obtained by infusing scorpions in olive oil, and employed with much confidence by the Spanish physicians, as an embrocation to the back in the treatment of ague.

The great naturalist Pliny speaks in terms of commendation of the virtues of tortoise broth in king's evil and swelled spleen. This broth, he says, has a power "Strumas discutere, ac lienes tollere."*

Other cold-blooded animals were, for many centuries, supposed to possess remedial efficacy. The flesh of the viper, for example, was employed from the very commencement of the Christian era. It was administered by the physician of Julius Cæsar. Galen believed it to be efficacious in elephantiasis; and our distinguished countryman Roger Bacon describes the case of a young German lady, whose constitution was so impaired that her hair and nails came off, but who, by a persevering diet of viper's flesh, became in appearance younger and more beautiful than before. Dampier, in his Voyages,† mentions that the people of Tonquin use, as a cordial, vipers and scorpions infused in wine. The learned Mead‡ observes that the physicians of France and Italy commonly prescribed the broth and jelly of viper's flesh to invigorate and purify the mass of blood; and he adds, that this remedy has an efficacy to scour and cleanse the glands from the stagnating juices which, turning to acidity, are the origin of many of those troublesome diseases called scrofulous, leprous, &c.; and that British physicians were too sparing of its use. Dr. Mead's

* C. Plinii Sec. Hist. Nat. Lug. Batav. 1669. Lib. xxxii. c. 4.

† Vol. ii. part i. p. 53.

‡ Med. Works, London, 1762.

recommendations were apparently disregarded, for not long afterwards viper flesh ceased to have a place in our Pharmacopœia; but, even if this long popular remedy was superstitiously introduced, it is quite possible that it may have possessed useful properties, and have been somewhat capriciously dismissed.

With a view to determine whether remedial efficacy was inherent in animal oil generally, as well as in that from fish, it occurred to me some time since to try the effect of the oil obtained from the foot of the young heifer (neat's-foot oil.) In the first half of the year 1849, I recorded the weights and other important particulars of fourteen phthisical patients who were put under the use of this oil. Three of these patients derived essential benefit, the disease being arrested; four were slightly relieved, five received no obvious advantage, and two retrograded rapidly. You will find, on comparing these results with those obtained from the employment of other modes of treatment, that the benefit was greater than under any remedy previously employed excepting the cod oil; and the similarity of the effects in favourable cases to those produced by the last-named medicine, will be rendered obvious by a brief narration of two of the most remarkable.

J. K., a tailor, aged thirty-four years, unmarried, square built, of middle stature, and dark complexion, was admitted as an in-patient November 20th, 1849. He was born in Cork, but had lived for fifteen years in London; and was accustomed to sleep in a close room, and to work in a confined apartment with from forty to sixty companions; always feeling faint and weak in the evening, and occasionally indulging in drinking bouts

which much impaired his appetite. He had for three years been unemployed during the winter months; and had suffered from syphilis and gonorrhœa. His brother, who was accustomed to work with him, lately died in this hospital. He lost a sister, aged sixteen, from phthisis; and his mother died at the age of thirty-eight, probably from the same disease. His father is living, aged sixty-one; and a sister, aged thirty-six, with a family of five children.

Physical signs on admission.—Respiration abdominal, with much tilting up of the lower part of the chest; little movement of the upper part. Left side of the apex; expiratory murmur equal in duration to the inspiratory. Right side: percussion dull over the whole side. Amphoric voice above the mamma; amphoric respiration below. Legs much swollen from œdema. Has profuse night sweats, and expectorates about a pint in twenty-four hours, but has never had hæmoptysis. Four years since he weighed nine stone, five pounds, but since that time has gradually, and for some months rapidly, lost weight.

Treatment.—Ordinary diet, with eggs, and an extra allowance of milk; cod-liver oil externally and internally. For the cough, blisters were applied, and he took in succession hydrocyanic acid, four minim doses of tincture of aconite in spermaceti mixture; and afterwards morphia, with which gallic acid was combined, with a view to moderate the perspirations; acetate of potash and decoction of broom were also given, on account of the œdema.

On the 29th of December he was still unable to leave his bed; and, as the symptoms were aggravated, and

his weakness increasing, I determined to give a trial to neat's-foot oil, thus combined: two ounces of neat's-foot oil, a drachm of solution of potash, and six ounces of peppermint-water; of this mixture, an ounce thrice a day. Under this treatment, the pulse, which on the 29th of December was 100, gradually improved, being on January the 9th, 84 and fuller, and on the 4th of February, 80. At this latter date he was sufficiently improved in strength to go down stairs to be weighed, and was found to weigh seven stone, five pounds, and three-quarters. The weight steadily increased, being on February 13th, seven stone, six pounds; March 1, seven stone, six pounds, and a half; March 16, seven stone, seven pounds, and three-quarters; April 16, seven stone, nine pounds, and a half. Three grains of tannic acid, in infusion of cascarilla, were given twice or thrice daily with apparent advantage; and the expectoration was gradually reduced to half the previous quantity. The respiration on the left side improved, and amphoric sound superseded the gurgling previously heard on the right side. In the third week of April he left the hospital, so much improved as to be able to resume his work. His blood was obligingly examined for me by Mr. Rodgers, who reported that it contained fully the healthy average of red corpuscles; but that, as the bottle had been covered with animal membrane, some allowance should be made for the possible escape of a little serum.

T. G., aged twenty-four, admitted into the Le Blanc ward, June 24, 1850. Hereditary liability to phthisis on the paternal side. For eighteen months subject to cough, and occasional hæmoptysis. Physical signs: chest flattened; left side, upper part, expiratory mur-

mur nearly equal to inspiratory; right side, defective expansion; dulness on percussion; humid crepitation (clicking) in infra-clavicular region; dry crepitation (crackling) near the base of the scapula.

He had taken cod-liver oil for eighteen months; but, as he was losing ground, I substituted the neat's-foot oil, at first in doses of two drachms, subsequently half-an ounce three times daily. His weight increased as indicated below.

June 25th, eight stone, eight pounds; July 1st, eight stone, eleven pounds; August 15th, nine stone; September 7th, nine stone, two pounds. He was dismissed generally improved.

It will be observed that, in the two instances just related, the good effects of the neat's-foot oil were manifested after cod oil had been given in vain.

The cases now tabulated of patients whom you have examined, and who have been taking other oils, would not alone be sufficient to authorize any positive conclusion; but the harmony of the results with previous observation, enables me to present them with more confidence, as a fair representation of what you may expect from the use of these remedies.

H. D., a patient whose symptoms you have formerly investigated, is, you perceive, improving in appearance. She has gained nearly five pounds' weight in less than a month. The principal medicine which she has taken is sperm oil, in doses of two drachms twice or thrice daily.

The same treatment has been adopted in the case of P. J., in whom pectoriloquy, gurgling cough, and cavernous respiration, testify to the existence of vomica at the apex of the right lung. In about seventeen days

Name.	Age.	Disease and stage.	Date of Admission.	Commenced taking oil.	PULSE.		BOWELS.		WEIGHT.	
					On Admission.	At present.	On Admission.	At present.	On Admission.	Subsequently.
P. D.	37	Phthisis, 1	Jan. 8	Jan. 10. Neat's-foot oil.	78	60	Confined.	Regular.	st. lb. 9 13	Feb. 8 . 10 5 Feb. 26 . 10 6½
W. U.	32	Phthisis, 1	Jan. 6	Jan. 11. Neat's-foot oil.	72	100	Relaxed.	Regular.	10 7¼	Feb. 8 . 10 8¼
W. J.	14	Phthisis, 2	Jan. 18	Jan. 18. Neat's-foot oil.	104	—	Relaxed.	Regular.	5 7¼	Feb. 5 . 5 10½ Feb. 26 . 5 12½
W. K.	46	Doubtful.	Jan. 14	Jan. 15. Neat's-foot oil.	80	100	Regular.	Regular.	8 11¾	Feb. 7 . 8 11
M. A. G.	29	Phthisis, 2	Feb. 4	Neat's-foot oil.	100	—	Regular.	Regular.	6 9½	Feb. 18 . 6 9½
E. B.	23	Phthisis, 1	Jan. 27	Jan. 28. Sperm oil.	80	80	Regular.	Regular.	6 10½	Feb. 18 . 6 10
H. D.	35	Phthisis, 3	Jan. 27	Jan. 28. Sperm oil.	78	100	Regular.	Confined.	8 0	Feb. 21 . 8 4¾
P. J.	22	Phthisis, 3	Jan. 30	Feb. 3. Sperm oil.	92	—	Relaxed.	Regular.	7 11½	Feb. 20 . 7 13½
M. M.	29	Phthisis, 1	Nov. 25	Nov. 28. Phosphoretted almond oil.	92	80	Regular.	Relaxed.	9 0¼	Feb. 8 . 9 5
C. H.	41	Phthisis, 1	Feb. 4	Phosphoretted almond oil.	88	76	Regular.	Regular.	7 6	Feb. 18 . 7 8

her weight has increased two pounds, and her bowels, previously disordered, have become regular.

These results are very similar to those which we have learnt to expect from the administration of cod-liver oil, but not more marked than those which we find induced by the oil of neat's-foot. Of three patients who have been under the use of that medicine for a month, you perceive from the table that one of them, W. J., has gained more than three pounds in weight; another, P. D., six; and in both these instances there is also in other respects as much improvement as could possibly be expected in so short a period.

M. M., a member of a consumptive family, and in whom you conclude, from the prolonged expiratory murmur below the sternal half of the left collar-bone, that phthisis has commenced, was put under the use of phosphoretted almond oil, a grain being dissolved in a pint of the oil, and two drachms of this mixture given twice or thrice daily, with some advantage, especially as evidenced by a considerable increase of weight. The remedy has been discontinued in consequence of the bowels becoming relaxed. It is, however, doubtful whether this occurrence is attributable to the administration of phosphorus, for in several other instances it has not been observed; for example, in the case of C. H. Another patient, S. K., affected with phthisis in the third stage on the right, and in the first stage on the left side, took cod-liver oil first, for two months, as an out-patient, and subsequently in the hospital for about the same period; but she continually lost ground, and her weight declined from eight stone, twelve pounds, in August, to eight stone, three pounds, in

November. I then substituted phosphoretted almond-oil for that of the cod-liver, and in a week the pulse became slower and the weight increased. The amelioration, however, proved temporary, and she left the hospital only slightly benefited. I am sorry to say, that in most of my experiments with phosphoretted oil, this has been the result, as though the phosphorus, although affording a favourable stimulus for a short time, yet had its good effect from some cause or other speedily exhausted.

In the table of the constituents of cod-oil, you will observe the phosphorus enters in sufficient quantity to deserve attention. Whether this substance be inherent in minute portions of liver intermixed with the oil, or is a natural element of the remedy, may be a question, but it was the circumstance of its presence in cod-oil which induced me to try whether the addition of phosphorus would in any way assimilate the effect of this vegetable oil to that of the oil from cod's liver; and although the benefit derived has proved transient, it is sufficient to warrant a repetition of the experiment. There may be cases in which a favourable turn may be given to the condition of the patient by its use, and the way be thus prepared for the successful adoption of other measures; and I cannot help suspecting that the phosphorus present in cod oil does contribute some share to the happy influence of that remedy. There are, indeed, scientific reasons for suspecting that the introduction of phosphorus into the system may exert an influence on the respiratory process, and on the condition of the blood. The important function of the lungs is to convert venous into arterial blood. It has long been known that oxygen is concerned in effect-

ing this change. Dr. Stevens, however, showed that another cause,—namely, the presence of neutral salts,—could accomplish the change, even when no oxygen was introduced. It has been further proved that more oxygen is absorbed during respiration than is accounted for by the quantity of carbonic acid exhaled. How are these facts to be harmonized? I suspect that some experiments of Dr. G. O. Rees,* which appear to me replete with interest, may assist us in explaining the relation of these facts. Dr. Rees has shown, in those observations, that venous blood contains much phosphorized fat, but little phosphate of soda, whilst arterial blood contains a small proportion of phosphorized fat, but a large amount of phosphates; an important part of sanguification appearing to consist in a gradual conversion of the alkaline lactate and albuminate of soda present in the chyle, into phosphates.

If there were time to indulge in speculation, I might suggest several practical applications of the conclusion above mentioned, but I will content myself with proposing the inquiry, whether an additional supply of phosphorus, by attracting oxygen in the process just noticed, may not tend in consumptive patients to lessen the unfavourable oxidation by which pus is largely formed in the lungs. An excess of oxygen in the lungs is considered favourable to the process of suppuration, but if any superfluous oxygen is occupied in the conversion of phosphorized fat into phosphates, the healthy processes might be promoted in consequence of that very excess, and the occurrence of the super-oxidation, which would produce pus, be prevented.

* Brewster's Journal of Science, vol. xxxiii.

Such observations and experiments as I have to-day brought before you are not subjects of mere curiosity. The analogous actions of the different remedies introduced prove them to contain similar elements. By contrasting the composition of these substances, we may possibly obtain a key to the discovery of the cause on which their common influence depends, and may apply the knowledge thus obtained to the discovery of a new set of facts which might otherwise have escaped us. Thus the similarity of the influence of neat's-foot oil and cod-liver oil may help us to discover what constituents are unimportant and what essential to the remedial effect of either of these oils.*

Let me incidentally mention that the addition of cow-heel to broths appears considerably to increase their nutrient efficacy, and to be well adapted to the consumptive.

The conclusion to which the observations just detailed conduct us, is, that the other varieties of fish-oil differ from that obtained from the liver, rather in the degree of palatableness, and agreeableness to the stomach, than in any essential difference of virtue; that neat's-foot oil is less strictly similar; modifying the blood indeed in a corresponding manner, but differing from the liver oils in degree of aptitude for assimilation according to peculiarities in the digestive organs of the individual patient. It may therefore be regarded, not

* Dr. C. Radclyffe Hall has confirmed the opinion here expressed, of the value of neat's-foot oil, by some independent experiments, and has found this oil useful, especially when a morbidly red and furred tongue rendered the use of cod-liver oil inappropriate. London Monthly Medical Journal, July, 1852, p. 637.

so much as an equivalent as a rival to the cod-liver oil. Where cod oil fails, sperm or whale oil would probably be useless, but the failure of the oleum jecoris aselli is no proof that the oleum bubulum may not be administered with the hope of advantage, and from its greater cheapness and less penetrating odour it might be largely tried in the way of in-unction. Either oil may sometimes be advantageously substituted for the other, and although that of the cod will in the majority of cases prove most effectual, I think you are now in possession of facts showing that the neat oil is likely to prove a useful addition to our medical resources, and that both these oils probably act similarly, in combining with albumen and assisting in the supply of the chyle granules which enrich the blood.

After impressing on you the remarkable efficacy of animal oils, when appropriately administered, it may be right to guard you against expecting too much from their administration, in cases not presenting circumstances requiring their use; and here a little of the wisdom of our ancestors, as it found expression in a work published more than a century since, may be suitably introduced.*

"*Scaramouch:* I take that discovery of the benefit of oil and its application to have been the greatest that hath for a long while been made in the medicinal art, and yet you would fain make it ridiculous and useless.

"*Harlequin:* Indeed Scara', it is he that makes it ridiculous and useless by promiscuously giving oils in all cases. Their use is as old as physic, and physicians

* A Serious Conference between Scaramouch and Harlequin, by Momophilus Carthusiensis. London, 1719, p. 25.

in all ages have taken care to let us know when they are of benefit and when noxious. Dr. Woodward alone has made oil a panacea, and I never yet saw any pretensions to a universal medicine where there were any to common sense."

I must not conclude this lecture, without impressing on you the importance of the persevering use of animal oils when they are found appropriate. We must give them, sometimes alternated with steel or other tonics, even for many years, if we would overcome the liability to a return of the symptoms. The necessity and advantage of such a plan are well portrayed in a letter, now in my hand, from a patient, who was under my care during the summer of 1848, affected with vomica. In spring, 1849, he resumed work, and, with an interval rendered necessary by an attack of bronchitis, has continued working in a manufactory till the present time.

He gained twenty pounds in weight during his stay in the hospital. The longest period, during the last three years, that he has omitted the oil, was nine weeks, during which he lost ten pounds' weight, but on resuming it, he gained three quarters of a pound in weight every week for a considerable period. He writes, "I sometimes give the stomach a rest from the oil, for a fortnight, but whatever diet I then take there is a falling off. When I have a false appetite an hour after a meal, a good dose of oil upon ginger wine fails not to remove it." He adds, "I get the oil both pure and cheap. Mr. H., my surgeon, provides it, and a benevolent lady, Mrs. B., pays the bill." Is not this one of the best kinds of self-supporting dispensary?

The statement made in this lecture regarding vege-

table oils requires an important qualification in consequence of experiments which I have made during the first eight months of the present year (1853) with oil of cocoa-nut, which appears to me to possess medicinal properties similar to those of cod-liver oil. The results in the first thirty patients to whom I administered it bear comparison with those obtained in the first thirty-seven patients for whom I prescribed cod-liver oil, chiefly in the year 1845, as related to the Medical Society of London, and briefly described in some of the medical journals.* Amongst the patients to whom cocoa-nut oil was given, there were some instances of arrested phthisis, as decided as any I have been accustomed to attribute to the use of cod-liver oil, over which it possesses advantages in reference to economy and palatableness; and it is interesting to remark that its efficacy was experienced by some who had previously taken cod oil uselessly, and by others who had discontinued it on account of nausea.

* Lancet, June 27, 1846. Transact. Prov. Med. Assoc. New Series, vol. iii. p. 182.

LECTURE VII.

Urine—Importance of the office of the kidneys—Œdema of lungs from albuminuria—Renal disease rare in consumptive patients—Altered proportions of uric acid to urea in phthisis—Probable cause and remedy—Proportion of solid contents as influenced by the disease and the treatment—Conditions of the urine as an aid to diagnosis.

You are well aware, gentlemen, of the great importance of the office of the kidneys in separating from the blood certain nitrogenous materials which are no longer fit for circulation. If the function of these organs be for a hundred hours altogether suspended, death is almost an invariable result. Disturbed function of the kidneys is, however, more frequently the consequence of some altered condition of the blood, than of any inherent fault in these organs. For example, a superabundance of lithic acid in the urine does not prove that there is a faulty condition of the secreting apparatus. We might support this assertion by various examples. For instance, gout appears to depend mainly on the presence of uric acid in the blood, and the occurrence of this acid in excess in the urine is not, under such circumstances, an evil, but rather indicates and promotes the abatement of the disorder. Again, the disease called diabetes, is no proof of faulty kidneys. Maitland, Rees, and others,

have shown the existence of sugar in the blood in connexion with this malady, and the removal of that substance, through this outlet, is, under such circumstances, natural and necessary. There is, however, one common and important change in the condition of the urine—namely, that in which albumen is precipitated from it on the application of heat or nitric acid, which, when long-continued, is for the most part found associated with renal disease. The relation of this condition of urine to dropsy was observed by Cruikshank, Darwin, Wells, and Blackall, but it was reserved for our eminent contemporary, Dr. Bright, by a happy generalization, to establish the fact, that certain organic changes in the kidney are usually associated with albuminuria, whilst they also tend to modify the phenomena, and overrule the course of various other disorders. It is important you should be aware that persons affected with Bright's disease sometimes die rather suddenly with œdema of the lungs. Such a case occurred not long since at this hospital, and I regret that I cannot show you the kidney of the patient, but I will relate another case which will serve more completely to illustrate the subject.

Some time since I was requested to visit a young man, aged twenty-one, whose breathing was extremely oppressed. There was slightly more dulness on percussion over the right than the left side of the chest, but no bronchophony, and the only important physical sign, was a delicate, sub-crepitant rhonchus (small bubbling rhonchus) over the whole chest. The patient's hands had a pale wax-like appearance; the bites of some leeches applied the day before, were still weeping

thin blood, but there was no œdema of eyelids or ankles. No opportunity occurred for examining the urine, but the diagnosis of œdema of lungs as a result of Bright's disease was confirmed by the previous history. At the age of nine this patient had scarlet fever, followed by dropsy; seven years afterwards influenza, which was succeeded by œdema and bloody urine. Three months before his death he had a cough. This cough subsided, but he afterwards had some pain of ankles, followed by œdema; this, however, passed off, and three days before his death he returned from a visit to the country, considering himself tolerably well, when he got chilled, and was suddenly attacked with spasmodic cough, hoarse voice, and oppressed breathing. He died within two days of my visit. On inspection after death, some pleuritic adhesions were observed, and slight consolidation of lung on the right side, but not sufficient to make it sink in water. The pericardium contained about four ounces of serum. The heart exceeded its natural size by about one-half. The principal morbid appearances, however, were in the lungs and kidneys. The former were charged with serum, which flowed out copiously, wherever incisions were made, and they did not collapse until freed by compression from the fluid with which they were infiltrated. The kidneys were much enlarged. The left, which I now show you, is twice the usual size. A palish deposit varies its surface, and is so diffused throughout its substance as to render indistinct the difference between the cortical and vascular portions. You will trace in this history the marked tendency to renal disease, first elicited by scarlet fever, increased by influenza, perhaps

aggravated by indiscretion. You will observe insidious pleurisy; enlarged heart; swelling of legs, rather suddenly subsiding, and, after exposure to chill, sudden œdema of lungs.

This case is very instructive, and the narration of it may guard you against being taken by surprise, should any similar instance come before you. If, in any phthisical patient, you find the urine permanently albuminous, remember that death may occur from pulmonary œdema, long before the tubercular disease has made any serious progress.

Let me caution you, however, against the error of supposing that œdema of the legs, which is by no means uncommon in phthisis, has any necessary connexion with kidney disease. This œdema, when occurring at an advanced period of consumption, is usually an indication of debility, and perhaps of impoverished blood, but it rarely arises from Bright's disease, which is by no means a frequent concomitant of phthisis. You will find, in the "Guy's Hospital Reports,"* some remarks by Dr. Rees in reference to investigations regarding the relative frequency of the occurrence of albuminous urine in all the cases of disease taken miscellaneously. On one occasion no less than seventeen per cent. of the patients appeared to be thus affected. On another, when special care was taken to apply the nitric-acid test as well as heat, the proportion was still as much as nine per cent. Now, among ninety phthisical patients at present in the hospital, we find only two presenting this peculiarity;

* Vol. vi.

and my observations for a considerable period, during which it has been the practice to test for albumen, point clearly to the conclusion, that phthisis tends rather to prevent than to promote the occurrence of renal disease.

The patient who now presents himself, J. J., has a waxy, unhealthy appearance. You observe how large a quantity of albumen is precipitated when I apply heat or nitric acid to his urine. You are inclined to augur unfavourably of his progress. But as respects the lungs there is no evidence of advanced disease. All you detect there, is the peculiar wavy inspiration, which at a future lecture may be more fully noticed, affecting both apices, and indicating a deposit, not necessarily tubercular. The renal disease was probably induced by intemperance. The daily quantity of urine is thirty ounces, and its specific gravity only 1·015. We must give steel medicine, support the strength, and determine to the skin; but the prospect of improvement is very slight.

The other patient affected with albuminous urine, G. A., has cavernous respiration, and gurgling cough at the apex of the left lung. You observe the clear straw-coloured appearance which the urine so often presents in Bright's disease. You see how largely albumen is separated, when I apply heat or nitric acid, and, under the microscope, casts of the uriniferous tubes are observable. This patient perspires profusely at night; the tendency of Bright's disease to induce dryness of the skin being, in this instance, entirely overpowered by the hectic of phthisis.

Let us proceed to consider whether there is any

peculiarity of urine characteristic of consumption. A certain relative proportion of uric acid to urea appears to be necessary to the healthy state, and, generally speaking, to be preserved, notwithstanding a reduction of both materials by active exercise or other circumstances not disturbing the bodily health; but in phthisis, this relation of uric acid to the urea is disturbed, the proportion of the former ingredient being materially increased. The following table, derived from Simon* and Percy, brings this circumstance prominently into view:—

PROPORTION OF URIC ACID TO UREA.

	In a case of advanced phthisis.	A person in health.	In a pedestrian after great muscular exertion.
Solids,	64·08	67·00	49·20
Urea,	23·90	30·10	20·42
Uric Acid,	2·40	1·00	·64
Salts,	10·85	15·29	9·36

It may probably be stated as a general rule, (cases complicated with Bright's disease being excluded,) that whenever from any cause rapid waste of the system is proceeding, an excess of uric acid will be found in the urine. Analogies have been suggested between the uric-acid excess in the urine of consumptive patients, and the characteristic condition of the same secretion in reptiles; and the impaired respiration of the phthisical has been assumed to be the cause of the deranged proportion; but the presence of a similar condition in herbivorous birds, suggests a difficulty in the way of such an hypothesis; and the febrile state accompanying advanced phthisis affords a less objectionable explanation, especially when we include in the consideration the

* Animal Chemistry, vol. ii. p. 288, 169, Sydenham Soc. Ed.

altered character of the blood. Such a view derives confirmation from the fact that, under the use of cod-liver oil, the relative proportions of uric acid and urea very frequently return towards the natural standard; a statement which, with the help of Mr. Rodgers, I am able in general terms to confirm, although I have not yet received his detailed report of the quantitative analysis of the examples which I sent him to examine.

There is reason to think that, in consumptive disease the oxygen is deficient or misapplied, probably as a result of deficiency in the blood, and in consequence does not form in the proper proportions urea and carbonic acid, but rather uric acid. Whatever agent increases the number of blood corpuscles, or oxygen-carriers, facilitates the conversion of uric acid into urea. I call your particular attention to this inquiry, because there are few physiological circumstances more important than the influence of oxygen in the system; and the best method at our command for applying oxygen to its special purpose in the economy, is to improve the condition of the blood corpuscles, since they are the medium by which oxygen is conveyed for the accomplishment of its office.

The beautiful carmine precipitate which I now show you is "euroerythrin" combined with lithate of ammonia, the presence of which salt appears to be necessary to produce the deposit of euroerythrin and the consequent appearance of this beautiful urinary sediment. Dr. Golding Bird suggests some distinctive circumstances, especially its solubility in alcohol, as proving that this substance, for which he proposes to substitute the name of purpurine, is not purpurate of ammonia.

The patient by whom this specimen was passed has a very large suppurating cavity in the lungs, and I always suspect such a condition in the phthisical when this sediment appears, although it doubtless still more frequently occurs in other patients affected with serious organic disease, especially of the liver, quite irrespectively of diseases of the lungs.

The colouring matter of the urine in a healthy individual is said to contain about ·27 of oxygen, and in phthisis no less than ·33; but after the use of cod-liver oil, the proportion of oxygen approximates more or less to the natural standard.

If Scherer be correct in the opinion that much of the colouring matter of urine is composed of decayed blood corpuscles, you trace, as it were, in the facts just mentioned, the progress of waste, and derive additional evidence that the disease which we are considering, is as much a consumption of the blood as of the lungs.

Let us now proceed to the interesting question, how far the proportion of solid contents in the urine is altered in phthisis. I will presently exhibit to you a table by which you may estimate this proportion before and after treatment. The modifying circumstances connected with diet, medicine, temperament, and state of atmosphere, are so numerous, that any such rule must be liable to exceptions; but I believe you will find that with the progress of phthisis the amount of solid constituents is usually reduced. I lately made a comparison of the specific gravity and quantity of the urine in twelve cases of phthisis, in which very little medical treatment has been employed,—six in the first, six in the third stage, and multiplying the quantity by the two

last of the figures representing the specific gravity, the result obtained, after adding together the examples in each division was for the first stage 4200÷6=700; for the third stage 2690÷6=448. This observation is favourable to the conclusion that at the early period of phthisis the difference from the natural standard is not considerable, but that what may be called the anæmic character of urine, (presenting the pale aspect without sediment,) is apt to be established, when the disease has made considerable progress.

The table before you* furnishes some interesting materials for a consideration.

We have already mentioned the probable effect of administering cod-liver oil, in restoring a more natural proportion between the urea and uric acid. This remedy has been stated to raise the specific gravity of the urine. It appears to me that such a statement requires qualification. The list before you contains too few examples to be adduced as settling such a question; but it is worthy of notice, that, although in six cases the quantity of solid contents, as calculated in the way formerly described, is found to have increased after treatment with cod-liver oil, yet in three the quantity is diminished. Assuming such a discrepancy to be, as I believe, common, how is it to be explained?

The explanation probably is, that successful treatment, especially when animal oils form an important element in the plan, tends, by placing the blood in a state of greater aptitude for its office, to bring the urinary as well as other secretions nearer to the natural standard; lessening, therefore, the solid contents where

* See next page.

Names.	Disease and stage.	BEFORE TREATMENT.			AFTER TREATMENT.			Treatment, &c.
		Quantity	Specific gravity.	Solid contents.	Quantity	Specific gravity.	Solid contents.	
		oz.			oz.			
MEN.								
J. C.	Phthisis, 1	40	1.010	400	40	1.025	1000	Tartarized antimony and salines for a week.
W. J.	Ditto, 2	..	..	..	15	1.033	495	Neat's-foot and cod-liver-oil.
G. P.	Ditto, 3	40	1.010	400	40	1.015	600	Cod-liver oil for a month.
W. U.	Ditto, 1	20	1.030	600	25	1.026	650	Neat's-foot and cod-liver oil.
J. J.	Ditto, 1	40	1.020	800	30	1.015 very albuminous.	450	Cod-liver oil for a month.
W. K.	Ditto, 2	15	1.027	405	50	1.012	600	Cod-liver oil for a fortnight. Has gained 3 lbs. weight.
M. C.	Ditto, 2	80	1.010	800	50	1.015	750	Cod-liver oil for a month.
J. E.	Ditto, 2	35	1.016	560	40	1.017	680	Cod oil for ten weeks.
D. H.	Ditto, 2	..	..	..	60	1.011	660	Cod oil for five weeks.
B. H.	Emphysema.	40	1.025	1000	40	1.023	920	Quinine for three weeks.
WOMEN.								
P. J.	Phthisis, 3	..	..	..	35	1.028	980	Cod oil for six weeks.
M. A. F.	Ditto, 1	..	..	..	..	1.015	..	Cod oil for ten weeks.
E. B.	Ditto, 1	..	..	..	40	1.015	600	Sperm oil.
M. A. B.	Ditto, 3	40	1.021	840	20	1.026	520	Cod oil for six months.
L. D.	Ditto, 3	55	1.019	1045	35	1.027	945	Cod oil for five months. Has gained 11 lbs. weight.
S. A. M.	Ditto, 3	20	1.025	500	25	1.020	500	Cod oil for four months.
H. D.	Ditto, 3	..	..	..	50	1.016	800	Cod oil for three weeks.
M. A. G.	Ditto, 2	40	1.015	600	35	1.020	700	Cod oil for one month.
C. H.	Ditto, 1	35	1.015	525	40	1.017	680	Phosphoretted almond oil.
— B.	Ditto, 3	..	..	..	35	1.012	420	Salines for two days.

This table is given, subject to any qualifications which the doubts expressed by Lehmann, regarding this mode of calculation, may authorize.

they were previously excessive, and, in the more common deviation accomplishing the reverse result. The favourable effect is not confined to either stage.

In G. P. you find pectoriloquy under the right clavicle, so strongly marked as to be absolutely painful to the ear, and there are other indications of the existence of a considerable vomica. Under the use of cod oil the urine has materially altered, and, as you see, is now, in appearance, quantity, and specific gravity, a fair example of natural urine. In W. K. and J. E. (patients affected with phthisis in the stage of softening,) a similar change has occurred, the proportion of solid contents having risen respectively in these cases from 405 to 600, and from 563 to 680. A similar change is also frequently induced in the first stage, as exemplified in W. U., under the use of cod-liver oil, and in C. H., whilst taking phosphoretted almond oil.

The occurrence of a copious sediment, as may be noticed in several specimens on the table, is often observed when softening of tubercular deposit is commencing; and a disappearance of this sediment (when unaccompanied with the anæmic character, distinguished by paleness and low specific gravity,) may be regarded as a favourable indication.

The presence of microscopical crystals of oxalate of lime is not uncommon, but is, I believe, quite unconnected with phthisis. Indeed I have reason to think that when oxalates are observed in phthisical cases, you will commonly find them associated with diarrhœa, vomiting, or some decided symptom of indigestion.

You may, then, keep in view three marked conditions of urine as likely to occur in the course of phthisis.

First, the anæmic, of which that of E. B. is a fair example, the quantity being about thirty-five ounces, the specific gravity, 1·009; the proportions of urea, uric acid, and fixed salts, being alike diminished. Such a condition may usually be regarded as an indication for the use of steel medicines. The second variety is that accompanied with copious sediment, and in which the excess of uric acid is probably common. In such instances the indication afforded, as far as this single symptom is concerned, would be a soothing, unstimulating treatment, and the employment of cod-liver oil. The third variety is that characterized by an approach to the natural condition, and it furnishes evidence of favourable progress. Some authors have suggested the use of diuretics as a curative agent in phthisis, as though the tubercular element might be capable of removal by this outlet. I am not sanguine of any such result, but I believe that in forming our diagnosis, and determining our treatment, we may often derive aid from such observations as are glanced at in this lecture; since the changes described appear to have an obvious reference to the condition of the system, and especially of the blood; and although it is unsafe to trust to any single symptom, yet it will not be denied that those symptoms, which particularly manifest the state of the system at large, are more valuable and important than the mere local signs of pulmonary disorganization.

LECTURE VIII.

Early signs of consumption—Prolonged expiratory murmur—Mode of determining its degree—Causes—Relation to phthisis—Illustrative cases—Irritability of muscle—Cough—Fistula in ano as affecting the course of consumption—Diarrhœa—Causes and treatment—Charcoal—Sulphate of copper—Acetate of lead—Nitrate of silver—Bismuth, &c.

CONSIDERABLE evidence has been brought before you, gentlemen, that cases of consumption, which would formerly have been regarded as hopeless, may be ameliorated by treatment, and even issue in apparent recovery. But it must not be concealed that, with the aid of all our improved appliances, confirmed phthisis must still be regarded as a most destructive disease, and one in which, at every stage of its progress, the hope of beneficial treatment lessens in a remarkable degree.

It becomes, therefore, a most important object to detect the disease at its commencement, and with this view let me invite your particular attention to one of the earliest signs which can be traced by auscultation—namely, a modification of the expiratory murmur, consisting in an apparent prolongation, usually accompanied with an increase of coarseness. On examining healthy individuals, you will find that, ordinarily, the expiratory murmur is very slight, and very little more distinct in any one part of the chest than in another.

In some individuals, indeed, it is inaudible except during hurried breathing.

The natural elasticity of the lungs is essential to soft and uniform expiration. When considerable consolidation is produced in their texture, by tubercular or pneumonic deposit, bronchial expiration is produced; but, between the healthy state and decided consolidation, there are various intermediate conditions. When the pulmonary cells, as seen under the microscope, are only slightly thickened, and the glairy, grayish deposit, studded with little bright cells, characteristic of phthisical disease at an early period, is beginning to permeate the structure, bronchial expiration is not induced, but the diminished contractility of the cells, interrupted passage of air, and increased power of conducting sound, are sufficient to render the expiratory murmur more durable, coarse, and audible. In pursuing this investigation, be careful not to confound the inspiratory and expiratory *movements* with the inspiratory and expiratory *murmurs*. The duration of the two movements is nearly, if not exactly equal. In the natural state the inspiratory murmur occupies the whole time of inspiration, but the expiratory murmur, at least to ordinary ears, only a fourth of the time of inspiration, the remaining part of the expiratory movement being accomplished in silence. I believe the expiratory murmur follows the inspiratory immediately without a pause. With the progress of phthisis, the duration of the inspiratory murmur usually lessens materially, though not necessarily in proportion to the prolongation of the expiratory; and some practice is necessary in order to acquire an aptitude in determining how much of the

alteration depends on diminution of the duration of the inspiratory murmur, and how much on extension of the expiratory. You will find much assistance in estimating the relative duration of these sounds, by adopting a plan suggested to me by Dr. Sibson—namely, that of counting the number of strokes which can be given, by beating time with the finger, during the presence of each murmur respectively. The expiratory murmur, as disease advances, may gradually increase, until, instead of occupying, as in the natural state, a fourth part of the period of healthy inspiration, it may even come to exceed in duration the inspiratory murmur.

You will occasionally find it stated, even in writings of some authority, that prolonged expiratory murmur is a sign of doubtful value, and not to be relied on; but when reasons are given for this assertion, you will find them unsatisfactory. If no symptom of disease were to be regarded which did not require to be accepted with some qualification, and interpreted with discrimination, the science of diagnosis would dwindle into childishness. What, then, are the cautions to be observed in attempting to deduce conclusions from the sign under consideration? You will best learn them by examples. In the man, B. H., now before us, you find the expiratory murmur equal in duration to the inspiratory, over nearly the whole chest; but the sound on percussion is for the most part clearer than natural, and the diaphragmatic ribs rather recede than advance during inspiration. This patient has not an aspect nor a pulse characteristic of phthisis. His countenance is slightly livid, as though from imperfectly oxygenated blood: he has never had hæmoptysis. You see

the pulsation of his heart in the epigastrium. Such a case you would never mistake for one of phthisis. You readily recognise it as one of extensive emphysema, and the prolonged expiratory murmur thence derives a ready explanation.

Take another patient, in whom prolonged expiratory murmur is heard extensively, and indifferently at the lower and upper parts of the chest, but associated with sonorous and sibilant rhonchi. This is a case of chronic bronchitis. There is no circumstance to lead you to apprehend consumption. Again, you are probably aware that consolidation of lung in any part, from pneumonic or other deposit, may produce bronchial breathing, and the same cause, existing in a slighter degree, may induce prolonged expiratory murmur; but you will almost always find in the constitutional circumstances, the history, the expectoration, and the other physical signs, enough to guide you to the correct interpretation. Let me contrast such conditions with those in which the expiratory murmur is modified by tubercular disease. In the patient whom I now introduce, P. D., you may ascertain, adopting the means formerly described, that the expiratory murmur, at the apex of the left lung, is equal to the inspiratory, each murmur occupying the time required for five beats with the finger, and that the interval of silence is equal to two. Under the right clavicle the duration of the expiratory murmur might be represented by three. In other parts of the chest, expiration is not attended by any audible sound. There is no bronchial rhonchus, and the situation and degree of the phenomenon lead you to suspect phthisis. The movement of the chest

is natural, and there has been no decided hæmoptysis; but I think you will be able to distinguish a slight degree of dulness, when you strike the left clavicle, as compared with the right, and you will observe an irritable or quivering action of the intercostal muscles, produced by a smart blow, a fact which is worthy of notice as by no means uncommon in phthisical individuals. This patient has had a cough for six months; his expectoration is mucous, but, under the microscope, a few blood-globules may be detected. His height is five feet four inches; vital capacity by spirometer, 155 cubic inches, not quite a fourth less than the average for his height, and he weighs ten stone six pounds, having never, he says, exceeded eleven stone when in good health. These particulars, while they strengthen the conclusion to which you are led by the degree and place of the prolonged expiratory murmur, also serve to impress the value of the sign, by showing that the disease is at a somewhat early period.

In the next patient, W. U., the sign being only on the right side, were it not considerable, would be inconclusive, on account of the greater audibleness of the respiration on this side in the natural state; but it is so much prolonged, in this patient, as to exceed the inspiratory in length, the proportions being, four for the inspiratory murmur, five for the expiratory, and three for the interval of quiet. Furthermore, there is a little dry crepitation (crackling) at the apex of the right lung. This patient has had occasional hæmoptysis, has declined in weight fifteen pounds during the last two years, and has almost lost his voice. The aphonia depending probably on a relaxed condition of the laryngeal

membrane, we have applied medicines locally, by means of a slightly curved glass tube, as recommended by Trousseau and Belloc—if, indeed, we do not owe the original suggestion to Aretæus. In the first instance, we blew in alum, and subsequently nitrate of silver, mixed with twelve times its weight of sugar, just at the moment of inspiration. This mode of introducing medicinal agents into the windpipe is not, however, so easy and effectual as that adopted by Dr. Horace Greene. This probang, having a soft, globular piece of sponge, capable of absorbing about twenty minims of water, very carefully fastened to the extremity, if *very slightly* curved, when passed steadily and firmly downwards, can be readily introduced under the epiglottis, close by the root of the tongue. Occasionally I prefer introducing the solution by means of a syringe, which I have elsewhere described.* I usually employ a solution of two scruples of the crystals of nitrate of silver to the ounce of water, according to the recommendation of Dr. Greene; and in relaxed and some other diseased conditions of the mucous membrane, the benefit derived from this measure is often considerable, although you would not be so unreasonable as to rely on such a measure alone, unassisted by judicious attention to the management of the general health.

One more case—that of J. C.—I bring before you, the sign in question being confined to the right side of his chest, with reference to the objection that prolonged expiratory murmur on the right side is consistent with health. In this patient, the expiratory murmur near the right apex is as five, and the inspiratory as four.

* Lancet, June 19, 1852.

On the left side, the expiratory murmur is not above a third of the inspiratory. This difference is too great to be attributable to natural condition. You possibly detect slight dulness on percussion on the right side. This patient has had no hæmoptysis; but the pulse, which in the sitting posture is 80, is only 84 when he stands. He is nearly five feet seven inches high, and weighs ten stone two pounds and a half—a fair average for a man of his height. He has long had cough, but his constitution is scarcely at all affected, and, but for his cough, he would probably not have applied for medical relief. The disease is evidently at an early period: the symptoms, however, are definite, and the sign under our special consideration is perhaps the most prominent.

During the time of my attendance on the out-patients of this institution, I made this symptom, prolonged expiratory murmur, an object of particular notice, and among 2,000 consumptive patients, it proved to be the most remarkable of the physical signs in 288,—those cases presenting bronchial complications being excluded. Hæmoptysis had occurred in 91 of these cases; that is, in 31 per cent.,—a proportion calculated to confirm my opinion of the significancy of the prolonged murmur; and at the same time sufficiently below the average frequency of hæmoptysis, in the first stage of phthisis, to support the assumption that the prolonged expiratory murmur takes precedence of other characteristic signs, which are commonly assumed as requisite in order to prove the existence of consumptive disease.

With a view to the correct appreciation of the sign under our consideration, keep in mind the situation,

degree, persistency, and simplicity in which it is presented. Prolonged expiratory murmur slight in degree, if heard only on the right side, is inconclusive, but if confined to the left, is far more significant. The more limited the space over which it is heard, the greater the probability that phthisis is the cause. The persistency of the sign for a considerable period, if unattended with symptoms of bronchitis, emphysema, or pneumonia, indicates some permanent obstacle to the free exit of the air, and in a majority of instances this obstruction is of a tubercular character. In cases depending on pulmonary congestion, the expiration, after cupping, and other appropriate treatment, usually resumes its natural character; but excluding this and other complications before noticed, I have not recorded any instance in which this sign, once fully established, ever ceased to be obvious, unless superseded by other signs.

Although, in many instances, no specific complaint was made by the patients, except of debility, and although, in this respect, improvement occurred under suitable treatment, it was yet common for the murmur to increase in duration, and deviate more and more from its natural character, whilst sooner or later, dull percussion, bronchophony, hurried breathing, quick pulse, emaciation, and night perspirations, too often occurring in succession, afforded affecting testimony to the correctness of the first diagnosis.

A disturbed rhythm of murmurs, when established, I believe to be an unnatural condition, and the greater frequency of its detection on the right side may, I conceive, be readily explained; for if the respiratory sounds

be naturally rather louder on the right side than on the left, the more delicate indications of pulmonary obstruction should first be detected in that side. It would follow that in doubtful cases of apprehended phthisis, the absence of any changes in the expiratory murmur at the upper part of the right lung, would be a strong presumptive evidence of freedom from the disease. It is true that, in certain individuals, some degree of febrile action attends tubercular cachexy, before any local signs of tubercular deposit exist. But it has repeatedly occurred to me, when hereditary phthisis has manifested itself in a family, to be able, on examining the respiration of the surviving members, to prognosticate the approach of phthisis, from this sign alone, in the absence of any other suspicious circumstances, either local or general. When the expiratory murmur is altered, in consequence of emphysema or bronchitis, the extensive diffusion of the sign, and the other concomitant circumstances, will usually suggest a correct interpretation; and if we are careful to separate such sources of fallacy, I cannot but believe that the sign under review will prove no useless refinement, but one well deserving of careful attention, and perhaps the most early, significant, and conclusive, of the evidences of incipient phthisis. It is no valid objection that the detection of the symptom requires close attention, since it is an important object to trace the first appreciable inroads of an insidious disease. In summing up the conclusions to which the instances and statements, now adduced, conduct us, I would observe that, when the expiratory murmur is heard extensively, or on both sides, unassociated with bronchitis, emphysema, or con-

densed lungs, there is great reason to fear, not only that the disease is phthisical, but that it will make rapid progress. When the change of murmur is limited to a small portion of lung, and the general condition of the patient is favourable, the evidence of phthisical disease is fully as conclusive, but there is ground to hope that, by careful regulation of diet, by securing exercise in the open air, by promoting healthy nutrition, and administering suitable remedies, such as iodine, iron, solution of potash and cod-liver oil, more decided mischief may for a time be averted. I have reason to think that, under such circumstances, some years may occasionally elapse before softening takes place; and I cannot but believe that when the expiratory murmur is more carefully examined, in suspicious cases of phthisical tendency, the average duration of pulmonary consumption, in persons possessing means to avail themselves of necessary appliances, will be found considerably to exceed the period commonly assumed.

The symptom which it is the object of this lecture to illustrate, must be considered to take precedence of various other rather early indications, which have been incidentally noticed in former lectures, such as an unduly diffused impulse of the heart, especially on the right side of the chest, or a murmur in the second intercostal space to the left of the sternum, which probably owes its origin to the pulmonary artery. In many instances the prolonged murmur precedes even cough.

The vehemence of cough bears no relation to the severity of pectoral disease. It is sometimes a symptom of hysteria, and is unconnected with any chest affection. When hysteria is associated with incipient phthisis, it

will often be observed that this Protean malady is remarkably modified in its phenomena, not exhibiting its more common symptoms of globus hystericus, fits of laughter, crying, or convulsions, but manifesting itself by great aggravation of cough or dyspnœa, and even, it would appear, as in the case of E. B., by capricious and inordinate hæmoptysis.

Even when you are quite convinced that consumption has commenced, you must not conclude that the disease will necessarily make rapid progress; on the contrary, it not unfrequently remains apparently stationary for a considerable time. The causes of variation in this respect are often obscure, but are usually connected with constitutional conditions, the nature of the exciting causes, the habits of the patient, and the resources at command for the adoption of appropriate treatment.

Among the causes tending to retard the progress of pulmonary consumption, I am disposed to mention fistula in ano. A few years since there happened at one time to be under my care nine consumptive patients affected with this disease. I had the curiosity to inquire into the duration of the malady in each case, and found, on adding the periods together, and dividing by the number of patients, that I obtained an average of two years and nine months, although the disease had not in any instance advanced beyond the first stage. When you reflect that the duration of phthisis, in a majority of cases, does not exceed eighteen months, you will concur with me in the impression that fistula may, possibly in the way of derivation or counter-irritation, retard the progress of the malady. Practically this subject claims particular attention. When the surgeon

operates on fistula in the phthisical, the wound is inapt to heal; but, were it otherwise, the operation would be a measure of questionable propriety, if the disease tends directly or indirectly to abate consumption.

This subject leads me to remark, that although obstinate diarrhœa is a complication belonging for the most part to the later period of phthisis, yet that it sometimes sets in rather early. If excessive, it may exhaust the strength of the patient before the tubercular deposit has softened; if moderate, or kept in check by remedies, a certain amount of disordered action, at this part of the system, may occasionally tend, in the way of derivation, to prevent the progress of the pulmonary disease. The colliquative diarrhœa which so often rapidly exhausts the remnant of strength in advanced phthisis, is usually associated with ulceration or softening of the mucous membrane of the large intestines. Such an example I show you in these ulcers of the colon, from a patient in whom this symptom had been very urgent and intractable. The appropriate treatment of this distressing complication requires discrimination. The adoption of a bland, unstimulating diet is of great importance. The function of the liver sometimes requires to be assisted by means of a dose of blue pill, guarded with Dover's powder, and whenever there is enough of local tenderness to indicate the application of a few leeches, much relief may be expected from their use. Familiar remedies, such as chalk-mixture with opium, or the compound kino powder, are frequently successful, but in many instances more direct astringents are required; of these, acetate of lead is usually most prompt in its effect. Two pills, each contain-

ing one grain of acetate of lead, an eighth part of a grain of opium, and two grains of extract of henbane, may be given at appropriate intervals, washed down with a little distilled vinegar and water, in order to obviate colic: in some instances, the addition of half-grain doses of nitrate of silver has appeared to increase the efficacy of this remedy. Occasionally, even after the failure of acetate of lead, sulphate of copper proves useful; it may be given in doses of a quarter of a grain, with the same quantity of opium, and two grains of extract of Spanish liquorice.

You will recollect my having mentioned, in a former lecture, that on giving charcoal for another purpose, I was struck with its effect in checking diarrhœa (it also corrected fœtor of the breath;) and I have since been interested in learning that charcoal has long been employed in the West Indies as a remedy for diarrhœa.

In connexion with this subject, it may not be uninteresting to mention, that Dr. Pearce, in a letter to Dr. Lettsom, dated March 4th, 1768,* speaks strongly of the efficacy of gunpowder and lemon-juice in dysentery. Dr. John Davy also informs me that he has been accustomed to administer gunpowder, in the treatment of the last-mentioned disease, with very good effect. It is reasonable to believe that the charcoal had a considerable share in the efficiency of the remedy. In any trial you may be disposed to make of this agent, I would advise you to use animal charcoal, and to give the preference to that obtained from bullock's blood by means of heat. Charcoal, however useful it may be in obviating the effects of acrid intestinal secretions, does not appear

* See Pettigrew's "Memoirs of Lettsom," vol. iii.

to have any special adaptation to the treatment of the diarrhœa of phthisis. There are objections to the administration of powerful astringents, in the treatment of this form of diarrhœa. Amongst these objections I would particularly mention the occasional production of the opposite condition, by the employment of such medicines; and, on the whole, there is no remedy for this affection, which has acted so satisfactorily under my observation, as the trisnitrate of bismuth, which I commonly administer at intervals of four or six hours, in doses of five grains, combined with three grains of gum-arabic and two of magnesia. A larger dose may be given with safety, but that specified has appeared to me the most appropriate for the purpose. It is probable that in many cases phthisical diarrhœa depends more on the condition of the vessels in the neighbourhood than on the ulcers themselves, and the bismuth probably exerts a tonic influence on these vessels, as well as on any ulcerations. This opinion is not altogether speculative, since I have had opportunities of observing the power of this remedy, when scattered over the languid granulations of cutaneous ulcers, in restoring them to a firm and healthy character. The bismuth is not so prompt in its effects as acetate of lead, and therefore requires to be used with perseverance; but when care has been used to collect collateral derangements, I rarely fail in two or three days to observe amelioration of the symptoms, with this advantage,—that the good effect is permanent and without incidental disadvantages. Indeed, it usually gives a better tone to the digestive organs generally, and corrects the sinking feelings about the epigastrium, with which the consumptive patient is occasionally distressed.

LECTURE IX.

Interrupted, jerking, or wavy inspiration—Varieties, and their causes—Examples—Probable relation of the sign to a deposit in the lungs, not necessarily tubercular—Microscopical appearances of the blood—Indications afforded by the spirometer—Variations of weight in reference to the progress of consumption.

At the last lecture, gentlemen, we were occupied chiefly with the consideration of circumstances which may be considered distinctly indicative of the commencement of consumption. To-day I propose to bring under your observation a symptom of some interest and significance, and not without relation to phthisis, but still, as it appears to me, not a conclusive sign of the existence of the disease. The symptom to which I refer is a modification of the inspiratory sound, designated "inspiration *entrecoupée*," by Laennec; "inspiration *saccadée*," by Fournet; by some English writers, "jerking inspiration"—a term liable to objection, since it conveys to the mind the idea of the spasmodic jerk in the breathing (produced by asthma, hysterical conditions, or other nervous disturbance,) rather than the delicate and uniform peculiarity under our consideration. It is difficult verbally to describe this peculiar inspiration. To some observers, it might seem appropriate to compare it to the movement of

a cog-wheel, two or three cogs advancing in each act of inspiration. To others, the idea is better conveyed by representing inspiration as affected by a succession of waves, rather than a continuous current. Under this idea, I propose to term the peculiarity wavy inspiration. The inspiratory sound, instead of being equally sustained from its commencement to its termination, is divided into several parts. Sometimes it is more feeble than natural; at other times rather harsh, but not necessarily altered in character.

An examination of my notes, recording the history of about a hundred patients in whom wavy inspiration was a principal symptom, has convinced me that there are certain varieties of this kind of inspiration with which it is important to be familiar. One of these varieties probably depends on obstruction to respiration, produced by pleuritic adhesion. This variety of the sign occurs in nearly equal proportion on the right and the left side; it is, I think, increased by pressing the stethoscope firmly over the part: it is often attended with pleuritic friction sound, and is usually very distinct.

Another variety is apparently associated with rheumatic conditions. The wavy inspiration thus produced is usually high in tone, often rather widely diffused, and variable in situation, and usually accompanied by pain in the part. In confirmation of the opinion just expressed, it may be incidentally mentioned that small doses of colchicum are useful in the treatment of this affection, and that the use of lemon-juice, is likewise advantageous. This latter remedy has also appeared to me of service in some instances of intercurrent pleurisy in the consumptive.

A third variety occasionally accompanies bronchial affections, and under such circumstances the cause may be detected by the co-existence of rhonchi and other symptoms characteristic of bronchitis. Interrupted inspiration, however, according to my observation, in a great majority of instances has no necessary relation to either of those conditions. The sign, in a very large proportion of cases, is limited to the left side (contrasting remarkably in this respect with prolonged expiratory murmur,) and this fact is inconsistent with the idea of its necessary dependence either on pleurisy or phthisis. The usual situation of the sound is near the apex of the lungs in front; but occasionally I have observed it at the posterior part of the chest, where, indeed, it may occasionally be present without attracting notice.

These general remarks may enable you to understand the few instances which the hospital wards at present afford of the symptom in question.

I place before you a table of the principal conditions observable in those of my patients who present this peculiar kind of inspiration, and I will now give you an opportunity of examining them, in order that you may judge for yourselves whether I am correct in the opinion, that wavy inspiration is a symptom quite consistent with signs of established phthisis, but is also occasionally present in individuals free from any other indication of such disease. In W. K., the wavy inspiration may be distinctly heard just above the left nipple, but it is decidedly increased by making pressure with the stethoscope; and I conclude that it is induced by intercurrent pleurisy, associated with tubercular disease of the lung. The expiratory murmur, near this part, is

PATIENTS AFFECTED WITH WAVY INSPIRATION.

Name.	Age.	Occupation.	Period of commencement of chief symptoms.	Expectoration.	Height.	Weight.	Average weight for same height.	Vital capacity.	Average vital capacity for same height.
					ft. in.	st. lbs.	st. lbs.		
W. K.	46	Groom.	Debility and loss of flesh for 13 months.	Becoming flocculent.	5 7½	8 11½	11 0	100	230
M. F.	32	Female servant.	Debility for 5 years.	Frothy; slightly streaked with blood.	4 10½	7 8¼	8 0	—	—
J. J.	32	Coachman.	Cough for 8 months.	Viscid, without blood.	5 3¾	8 4½	10 0	140	204
J. P.	25	Navigator.	Cough for 21 months.	Muco-sanguineous.	5 8½	12 0	11 7	210	240
M. M.	29	Female servant.	Cough, with occasional expectoration, for 2 years.	None at present.	5 3½	9 6½	9 12	—	—

prolonged, being equal in duration to that of inspiration. This patient is below the average in weight, being less than nine stone, although five feet seven and a half inches in height; his vital capacity is 100 instead of 236. His expectoration is approaching to the flocculent character, and you may distinguish moist crepitation, (clicking) under the left clavicle. This case is not an example of the particular form of wavy inspiration which I propose specially to illustrate in this lecture, but may serve, by its strongly-marked character, as a good introduction of your ear, and may thus qualify you to detect the more delicate varieties to which I have to invite your attention.

The next patient, M. F., has a strong hereditary title to phthisis, having lost her mother, uncle, and two aunts from that disease. Her expectoration is frothy, salivary, slightly streaked with blood; but, with this exception, she has no definite consumptive symptom. In the left subclavicular region, wavy inspiration is distinct; on the right side the respiratory sounds are natural, and there is no prolongation of the expiratory murmur. She has complained for five years of debility, and of variable pains about the chest; but although there is reason to apprehend the ultimate establishment of phthisis, there is, nevertheless, ground for hope that more formidable symptoms may for some time be deferred. Her height is four feet ten inches and a half; her weight seven stone, eight pounds and a quarter.

In J. J. you find a delicate wavy inspiration near the acromial end of the left subclavicular region, and also in the suprascapular region on the right. You do not discover deficiency of movement, nor any dulness

on percussion, but the occurrence of the sign on both sides augurs unfavourably. This patient's pulse is the same sitting and standing, and his vital capacity is thirty per cent. below the natural standard.

The next patient, J. P., has not at all a sickly appearance, and on a careful examination we find none of the ordinary physical signs of consumption. His weight is a fair average for a man of his class, but he believes himself to have declined in this respect. It is true that his pulse is not affected by change of posture, and his expectoration contains a little blood; but these latter circumstances may possibly have reference to the existence of slight hypertrophy of heart. You may, however, discover a little wavy inspiration at the middle of the left subclavicular region, and this circumstance, viewed in connexion with diminished vital capacity (navigators having usually a slight excess in this respect,) and the fact of his having had cough for twenty-one months, obliges us to regard his case with some suspicion.

The last patient for you to examine to-day is M. M. She has lost both parents and two sisters from phthisis. Her only symptom is a dry cough, but this has lasted for two years, and I suspect that the delicate wave at the apex of the left lung must be considered a proof of the existence of some slight deposit in this situation.

I was once accustomed to regard the sign which I have now brought under your observation, as a proof that phthisis had actually commenced; but more extended opportunities of watching patients in whom it has continued for many years without becoming complicated with any other indication of disease, have in-

duced me to modify that opinion. It is true that I have certainly often observed wavy inspiration at one part of the chest when pectoriloquy or cavernous respiration could be elsewhere detected, or when other indications, local or general, of advanced consumption have been present; and in a greater number of instances the wavy inspiration has been superseded by the occurrence of bronchial respiration, dulness on percussion, dry crepitation (crackling,) or other more or less decided evidences of the establishment of phthisis; but, in a still greater proportion of cases it has continued, for a considerable period, to be the only important evidence of deviation from the natural state. Often indeed I have watched the symptom for years without observing any transition to serious disease. Of 105 cases, carefully recorded in the course of an investigation which I formerly made regarding this symptom, thirty-two afforded grounds for suspecting tubercular disease; such, for example, as dulness on percussion, or prolonged expiratory murmur. In twenty-two hæmoptysis had occurred. In three, a murmur could be heard over the pulmonary artery. But, of the remainder, many were not affected even with a cough, and their complaints were usually expressed in general terms as of "delicate health," "easy fatigue," or, if they made any reference to the chest, it was seldom of anything beyond slight oppression of respiration—or of "seeming to breathe through thin cambric." It is therefore reasonable to conclude that, if this form of interrupted inspiration be an indication of tubercular disease, it is the earliest local sign with which we are acquainted. The question, however, naturally occurs, can this

symptom depend on mere functional disturbance, and disappear, leaving the subject of it in apparent health? Having devoted some attention to this inquiry, I must acknowledge that although wavy inspiration, when dependent on pleurisy, bronchial affection, or rheumatism, may disappear, I have not satisfied myself of its removal (unless superseded by more serious symptoms) in any instance unconnected with the conditions which I have specified. To what cause then can the production of so persistent a phenomena be attributed? The sensation conveyed to the ear suggests the idea of some obstruction in the pulmonary tissue, yielding at gradual intervals to the admission of air. The persistency of the sign points to some organic change, whilst its frequently stationary character encourages the belief that such change is not necessarily tubercular.

Sufficient opportunities have not occurred for conclusively testing any hypothesis, but the explanation which would appear best calculated to meet the conditions would assume the existence of an exudation, less albuminous than tubercle, less fibrinous than the usual product of common inflammation, about the walls of the small bronchial tubes, and the interstices of the pulmonary substance, calculated to impair the elasticity of the surrounding structure.

The frequent existence of such an exudation is not a matter of speculation; it is, indeed, described by Rokitansky as not unfrequent. We may suppose that such morbid product of low inflammation may sometimes be sufficiently plastic to become organized, and to constitute hypertrophy of the cells and lobules, without involving any serious pulmonary disorganiza-

tion or constitutional disturbance. In other instances it may be associated with the germs of true tubercle, or become a favourable nidus for tuberculous deposit. When, indeed, distinct manifestations of phthisis appear in patients exhibiting this sign, the disease usually advances with marked rapidity. We may form an approximative idea of the proportionate degree of probability of such a course, from the relative frequency of the occurrence of hæmoptysis. We may assume this symptom to occur in half the cases of phthisis in the first stage, as determined by recognised signs. I have formerly stated that it occurs in about a third of those cases in which prolonged expiratory murmur was the principal physical sign; and in the cases which I have analyzed, chiefly characterized by wavy inspiration, hæmoptysis occurred in about a fifth.

As tending indirectly to support the view now suggested of the pathology of this symptom, we may specify the large proportion of such patients engaged in out-door occupations. You will observe, amongst the patients I have introduced to you to-day, that the three men are all engaged in out-door occupations. Of the cases which I formerly recorded as examples, a very large proportion was composed of gardeners, policemen, coachmen, sailors, and toll-collectors.

The more frequent occurrence of the sign under consideration, on the left side, is worthy of notice, and the cause not easy to determine. Its occasional presence on the right side alone, independent of other considerations, is unfavourable to any hypothesis which would refer it to the action of the heart, or to a disproportion of the respiratory to the circulating power.

If a morbid deposit be engaged in the production of the wavy inspiration, it would seem that such deposit must be most apt to occur on that side of the chest; but the more direct course of the right bronchial tube, and the excess of diameter of the three branches on the right side, over that of the two branches on the left, by facilitating the ingress of air, may render a greater amount of obstruction necessary to establish an interrupted murmur on the right side.

It would be a great advantage, to be able to detect tuberculosis of the blood, prior to the establishment of any real tubercular disease. With this view, I have from time to time availed myself of the microscope in order to ascertain whether any difference could in this way be detected between the blood of the phthisical and that of healthy individuals. You are perhaps aware, that when a drop of blood taken from a suitable part, the finger for example, is placed on the glass for examination, the corpuscles, after a period, varying much in duration in different subjects, often exhibit a change of outline; the discs becoming mulberry-like in form, then stellated or corrugated, as delineated in the drawing,* in the preparation of which I have been politely assisted by Mr. Quekett. The promptness of this change, as before observed, varies. It is probably accelerated in healthy individuals by exercise or any circumstance which quickens the pulse; but I have satisfied myself, that quickness of the circulation is not the only cause of the phenomenon; as far as I have yet observed, it would appear to occur more quickly in consumptive than in healthy persons, and more quickly

* Plate I. Fig. 2.

in some consumptive patients, although at a corresponding stage of the disease, than in others; and I am inclined to think, that those patients are most likely to improve whose blood is longest undergoing this particular change. H. I. C. afforded an interesting illustration of this remark: as may be frequently observed in the blood of consumptive individuals, there was a considerable number of large colourless corpuscles, but the ordinary blood corpuscles, whether forming rouleaux or otherwise, preserved their individuality for a long period, and the discs did not assume a crenate outline after the lapse of three quarters of an hour; and this patient, although afflicted with phthisis in the second stage on the left, and the third on the right side, was discharged from the hospital materially improved.

In some unfavourable cases, the blood discs almost immediately lose their characteristic form, and seem to melt into a confused mass, as is said to have been observed in the blood of the spleen, and as I have noticed in a patient undergoing a severe course of mercury. In such instances the disease may be expected to advance rapidly. Observations of this kind are liable to many fallacies; since it is possible that temporary causes, such for example as mental emotion, may modify the results; still I recommend the inquiry to your attention, as worthy of regard when pursued concurrently with other modes of investigation.

In tracing the early indications of consumption, you will observe that I have particularly recorded the measure of respiratory power denominated "vital capacity," as deduced from an instrument called the spirometer, constructed on a similar plan to the gasometer, and in-

tended to ascertain the capacity of the lungs for air. The person using it should have his garments loosened, and should stand erect, with his head thrown back, and immediately after taking a full, slow inspiration, adjust the mouth-piece closely to his lips, and empty the lungs as far as possible by a slow, complete expiration. Dr. Hutchinson* has deduced from an extensive series of observations the remarkable law, that in a state of health the vital capacity has a relation to the height of the individual, and that it increases in the proportion of eight cubic inches of air for every inch of stature from five to six feet. In several hundred cases examined at this hospital, we have found the average reduction of vital capacity after the second stage, that softening has commenced, to be more than fifty per cent.; whilst in the first stage,—that, namely, before softening,—the average reduction has been about thirty per cent. It is desirable to mention by way of caution, that in their early trials with the instrument, "some patients, in consequence of nervousness or inexperience, do not expire an amount of air equal to their vital capacity; unfavourable conclusions, therefore, should not be hastily drawn; but when an individual expires his average quantity, it is fair to assume that he is free from tubercular disease;"† and when the quantity nearly approaches the average, we may also reasonably conclude that tubercular disease, if existing, has made little progress.

You perceive that in the table before you, the weight of the patient is also recorded. Change of weight is

* See "Medico-Chirurgical Transactions," vol. xxix.

† First Medical Report of the Hospital, p. 26.

one of the most valuable single indications of the course which the disease is taking, whether favourable or otherwise. In many instances, you will find a deficiency of weight to be one of the first circumstances calculated to excite your suspicions. It is, however, important to have carefully deduced averages for our guidance; and here, again, I avail myself of the laborious investigations of Dr. Hutchinson, the averages represented in the table being given on his authority. It is a fair approximation to say that a person five feet high should weigh 120 pounds; one at five feet four inches, 140 pounds; at five feet eight inches, 160 pounds; and at six feet, 180 pounds; thus calculating an addition of about five pounds' weight for every additional inch in height. This calculation you will find sufficiently near the fact for ordinary purposes. There are, however, remarkable exceptions to any general law in reference to such standards; great deviations in this respect are consistent with health. One of the most striking examples is that of Smith, the pedestrian, who, at the age of about forty, with a height of five feet five inches, weighs only 102 pounds, instead of the average which I have mentioned of 145 pounds, or as registered by Dr. Hutchinson, 142 pounds. Nevertheless, Smith may be adduced as an example of a healthy, energetic man. His stride is from four feet two inches to four feet four inches, and he has been known to walk twenty miles in two minutes less than three hours.

The circumstance of most importance in applying the question of weight to diagnosis, is not the absolute weight, but the direction of any change which may be in progress. With this view, you should always en-

deavour to ascertain the greatest known weight of a patient; for no single fact is more frequently associated with the setting in of phthisis than a marked reduction in this respect. The common, and in many cases stealthy approach of consumption, among the inmates of prisons, is often first detected by a progressive diminution of weight, notwithstanding the influence of improved and regular diet.

Allow me, in conclusion, to recur to the principal subject of this lecture—namely, wavy inspiration. Patients in whom this sign is observable, in addition to slightly impaired vital capacity, and probably diminished weight, are generally delicate in appearance, and easily fatigued. Cough is not necessarily present, and rarely severe. There may be occasional uneasiness of chest; but symptoms calculated to attract attention to the lungs being often absent, it is expedient, in all obscure cases of impaired health in patients whose countenances are expressive of deficient or imperfectly aërated blood, to examine the chest in order to ascertain whether this variety of altered inspiration be present. The conclusions to which I am conducted in pursuing this inquiry are:—

1st. That wavy inspiration may be occasionally observed in cases of bronchial inflammation, pleurisy, and rheumatism; but that the most common variety is unconnected with those affections.

2ndly. That the variety most frequently observed (and distinguishable from the other varieties) may occur at various parts of the chest, but most frequently at the upper part of the left lung.

3rdly. That the symptom rarely disappears, except-

ing when superseded by definite signs of phthisis, but that it often continues for years without the supervention of that disease.

4thly. That when phthisis does ensue there is reason to apprehend rapidity in its progress.

Assuming these views to be correct, this symptom cannot be regarded as conclusive evidence of the presence of tubercular disease, but it does not the less retain its interest and value. Although patients in whom it occurs unassociated with other signs, may be considered on the verge of phthisis, it is gratifying to feel authorized to assure them that they present no evidence of tubercular disease, and that under favourable circumstances we may hope to avert any more serious impairment of health. The indications of treatment are to promote healthy nutrition, to correct hepatic congestion as far as possible, to obviate depressing mental emotion, to adjust clothing, and select climate, so as to secure, as far as possible, without unseasonable exposure, much easy exercise in the open air. Iodide of potassium is often an appropriate remedy, and, in many instances, iodide of iron; and counter-irritation is sometimes useful; but we must always remember that, although the disease is tending to localize itself in the lungs, yet the source is elsewhere.

LECTURE X.

Appearance of the gums in consumption—The border streaked; margined; pearly; thickened—Often changed at an early period of the disease—Influenced by habits, &c.—Clubbed fingers—Indigestion modified by consumption—Theories of the origin of the gingival margin—Its use in diagnosis and prognosis.

THE precision which auscultation has introduced into the diagnosis of established phthisis, has probably a tendency to induce partial neglect of some collateral indications, which, although affording us no certain information respecting the amount of local disease, nevertheless possess peculiar value as evidence of constitutional changes intimately connected with the morbid element. In the investigation of chronic diseases, one of the most important objects is to ascertain, as far as possible, the condition of the blood, and the degree of firmness or tenuity of the bodily structure in general. With this view I propose to-day, gentlemen, to invite your attention to a symptom which may perhaps have reference to some change in these conditions, as manifested in a part of the mucous membrane of the mouth. The introduction of some poisons into the system is occasionally manifested at the edge of the gums, where they are reflected around the teeth. Remarkable evidence of such an occurrence was adduced by the late

Dr. Burton, in an interesting essay on the absorption of lead;* and the question may fairly be entertained whether changes in the quantity or quality of the blood, characteristic of particular diseases, may not be occasionally manifested by visible changes in this part of the mucous membrane. Considerable attention to this inquiry has impressed me with a conviction of the frequent existence, in consumptive subjects, of a mark at the reflected edge of the gums, usually deeper in colour, than the adjoining surface, and producing a festooned appearance, by the accuracy with which it corresponds with the curve of the gingival border; this mark is in some patients a mere streak; in others, a margin, sometimes more than a line in breadth. In the most decided cases, this margin is of a vermillion tint, inclining to lake. The drawing† taken for me by Mr. Tuson from a patient of marked phthisical diathesis gives a correct representation of one of the most characteristic appearances. It is worthy of remark that the teeth in this instance are free from tartar, and that a coloured line also strongly marks the place where the mucous membrane of the lower lip is reflected on the gums. As a general rule, the line is most distinct around the incisor teeth, but it is frequently apparent also round the molars. I am not without a suspicion that the form of the mouth influences the direction in which the margin is most obvious, patients with a long upper lip applied closely over the jaw often presenting around the incisors either no line, or one only slightly marked, whilst around the canine teeth the margin is

* Medico-Chirurg. Trans., Vol. xxiii., p. 63.

† See Plate II.

MEN.					WOMEN.					
Name.	Disease and stage.	Hereditary predisposition to Phthisis.	Gums marked or not.		Name.	Disease and stage.	Hereditary predisposition to Phthisis.	Gums marked or not.		Catamenia.
			Upper.	Lower.				Upper.	Lower.	
T. T.	Hepatic disease	No	No	No	E. W.	Phthisis, 3	No	No	No	Absent.
W. H.	Phthisis, 2	Yes	Yes	No	M. B.	Ditto, 3	Yes	No	No	Absent.
G. S.	Ditto, 3	No	Yes	Yes	M. A. W.	Ditto, 3	Yes	No	No	Irregular.
C. B.	Ditto, 1	No	Yes	Yes	S. A. M.	Ditto, 3	Yes	No	No	
G. S.	Hydatids	Yes	No	No	L. D.	Ditto, 3	Yes	No	No	Absent.
W. G.	Phthisis, 3	No	Yes	Yes	F. R.	Ditto, 1	Yes	Yes	Yes	Irregular.
T. O'B.	Ditto, 3	No	Yes	Yes	M. A. F.	Ditto, 1	Yes	Yes	Yes	Irregular.
G. S.	Ditto, 1	Yes	No	Yes	E. H.	Ditto, 1	Yes	Yes	Yes	Absent.
T. M.	Ditto, 1	No	Yes	Yes	M. W.	Ditto, 1	No	Yes	Yes	Irregular.
S. W.	Ditto, 2	No	Yes	Yes	E. H.	Ditto, 3	Yes	No	No	Regular.
A. S.	Ditto, 2	No	Yes	Yes	J. B.	Ditto, 3	Yes	No	No	Ceased.
T. C.	Pleurisy	No	No	No	A. C.	Ditto, 1	Yes	Yes	Yes	Regular.
W. W.	Phthisis, 1	No	Yes	Yes	M. M.	Ditto, 3	No	Yes	Yes	Irregular.
H. B.	Ditto, 2	Yes	Yes	Yes	C. V.	Ditto, 3	No	Yes	Yes	
J. L.	Ditto, 3	No	Yes	Yes	M. A. W.	Ditto, 3	Yes	No	No	Irregular.
W. J.	Ditto, 2	Yes	No	No	S. T. D.	Ditto, 3	Yes	No	Yes	
W. M.	Diseased heart	..	No	No	M. D.	Ditto, 3	No	Yes	Yes	Absent.
B. H.	Emphysema	..	No	No	J. B.	Ditto, 1	Yes	Yes	Yes	Absent.
G. P.	Phthisis, 3	..	No	Yes	K. P.	Ditto, 3	No	Yes	Yes	Irregular.
D. H.	Ditto, 2	..	Yes	Yes	H. B.	Ditto, 1	Yes	Yes	Yes	Absent.
J. M.	Ditto, 1	..	Yes	Yes	M. A. C.	Ditto, 3	No	No	Yes	Absent.
J. O.	Ditto, 3	..	Yes	No						
J. P.	Ditto, 1	No	Yes	Yes						
M. S.	Ditto, 1	No	Yes	Yes						
M. Scr.	Ditto, 3	Yes	Yes	Yes						
G. A.	Ditto, 3	No	Yes	Yes						

well delineated. In toothless individuals, when the gums smoothly cover the sockets, no mark is observable, but when imperfect stumps remaining prevent the smooth adjustment of the surface, the streak is found. With a view to put you fairly in possession of materials for forming a judgment respecting the significancy and importance of this particular symptom, I have requested my clinical assistant, Dr. Bateman (to whom, as well as to Mr. Hunt and to Mr. Edwards, our resident medical officer, I am indebted for much assistance in this inquiry,) to draw up a table of the appearance of the gums in the forty-seven cases under his immediate supervision, and it is here offered for your consideration.

In the first division, containing the particulars of twenty-six men, you observe that only six are free from the margin, and that the twenty who present the margin have also distinct symptoms of consumption. In five of those without the line, there is also freedom from other consumptive symptoms; the diseases in these patients being respectively emphysema of the lungs, hydatid cyst, diseased liver, pleurisy, and diseased heart. Only one of the phthisical males, a boy, aged twelve, has unstreaked gums; and although the margin is occasionally observable in children, it appears to me, as far as I have yet noticed, to be more frequently absent in them than in adults. It is fair to mention, that in about six of the male patients, chiefly those with the disease in the first stage, the streak is so slightly marked as to render its presence almost a matter of question. I may add that in the comfortable classes of society, under favourable circumstances of regimen,

the mark is less constant than in my hospital patients; but with every deduction on the ground of these considerations, I am satisfied of its existence in a very large proportion of cases.

The exceptions amongst the female patients are far more frequent, as is apparent from the table on the preceding page.

You will see that of twenty-one phthisical women there are no less than eight without the margin, and it is remarkable that in each of these cases there is cavernous cough or other undoubted evidence of the existence of vomica. In two of them, namely, J. B. and M. A. M., there is cracked metal sound on percussion. On the other hand, among those exhibiting the streak, in six the disease is in the first stage, not having proceeded to softening. It is also worthy of note that, in seven of the men in whom the mark is observable, the disease has not advanced beyond the first stage.

The gingival margin usually encompasses alike the upper and lower incisors. In the most marked cases the margin is not confined to the incisors and canines, but surrounds likewise the grinding teeth, although it commonly appears narrower and fainter in proceeding backwards.

Amongst the patients in whom the margin is broadest and most vivid, I may instance J. L. When he whispers you may hear pectoriloquy under the left clavicle, and his cough, near the scapula on the right side, has a peculiarly cavernous and metallic character. This patient has been subject to dysentery.

Examine M. M.; you perceive gurgling cough at the apex of one lung, and *bruit de pot fêlé*. Her pectoral symptoms have been associated with diarrhœa.

There is a red, patchy appearance of the mucous membrane of the mouth. A similar condition formerly existed also in C. V., likewise affected with vomica; but under the use of refrigerant medicines, such as the citrate of potash, with hydrocyanic acid, the membrane is assuming a more healthy appearance, although the gingival margin continues distinct.

In the next patient, Todman, you find the margin, and you know, from the presence of humid crepitation (clicking) at the apex of the left lung, that there is tubercular softening in that situation.

You may object, that whatever may be the scientific interest of such an appearance, yet that it would be of little value as a means of diagnosis if confined to cases of advanced disease. Let me, then, bring before you instances in support of my assertion that it often appears among the earliest signs. A. H. was admitted into the hospital on account of winter cough. She has never had hæmoptysis, and although troubled with night perspirations, these are perhaps attributable to debility occasioned by menorrhagia. A hasty examination of her chest does not suggest a suspicion of phthisis, but her gums have the marks we are describing, and on a more careful investigation of the stethoscopic indication, prolonged expiratory murmur may be detected at the apex of the chest confirming the accuracy of the surmise which the gingival margin might lead us to entertain.

The next patient, M. W., I formerly introduced to you as affording an example of wavy inspiration. She presents no special signs of phthisis, but both her upper

and lower gums, you may observe, exhibit the characteristic streak. Among the reasons for suspecting that the indication is in this instance correct, I may mention a decided reduction of weight, and the presence of a peculiar form of indigestion. There is much pain of forehead; giving the countenance an appearance of great oppression; the tongue is furred, and the appetite greatly impaired. This condition is not persistent, but recurs from time to time, without any obvious cause, and yields only partially to treatment. No modification of diet has any apparent effect either in relieving or aggravating this condition. It differs materially from ordinary dyspepsia; and I cannot help referring it to a morbid state of blood, by which it is rendered incompetent to supply the proper secretions for accomplishing healthy digestion. If, as I believe, such a condition often ceases when tubercular disease is established in the lungs, is not the change attributable to the partial elimination from the blood into the lungs of the morbid element? This patient has appeared to me to derive more benefit from yeast than from all the alteratives and tonics previously administered; but the variety of phthisical dyspepsia, which it seems to me to illustrate, usually requires such medicines; for example, you may administer an occasional dose of mercury with chalk, combined with carbonate of soda, and followed by a powder containing a drachm of bisulphate of potash (sal polychrest,) and ten grains of rhubarb. The good effects of this plan will be promoted by the subsequent administration of fluid extract of sarsaparilla combined with taraxacum. It is unsafe, in such cases, to give mercury at all continuously, and the muriate of lime

has been supposed to be a suitable substitute for mercury as a deobstruent. I prefer the muriate of ammonia, in doses of from five to ten grains three times a day. On the whole, I know no medicines better calculated than a combination of chalybeates with saline aperients, to obviate hepatic congestion, and to correct the condition of blood which may be assumed to characterize such cases. For those who are able to obtain the mineral waters, whether at the natural spring or factitiously prepared, a course of the Kesselbrunnen of Ems is appropriate; or if there be any tendency to hæmoptysis, the Saratoga Congress Spring of America may be given in preference. When these remedies are not accessible, a substitute may be obtained by administering, every morning, two grains of sulphate of iron, a drachm of sulphate of soda, a scruple of carbonate of soda, and ten grains of dinner salt, in half a pint or a pint of warm water. Exercise in the open air, the shower-bath, and friction of the skin, are important auxiliaries in treatment.

But to return from this digression. I have mentioned that the streak on the gums is not always present in consumption; let me add that its absence may be regarded as belonging to the class of favourable circumstances. Apply your stethoscope under the right clavicle of W. J. when he speaks. You probably hear what you may be inclined to call bronchophony; but bid him whisper, and I think you will be satisfied that the voice resounds as it were in a little cavity; that, in short, it is cavernulous. The expectoration, although chiefly mucous, is variegated with little purulent spots, which strengthen the suspicion of the existence of a

cavity. He is, however, improving in condition, and says that since he obtained his order for admission he has "got well." His gums are without margin.

The next patient, M. A. B., has gums free from the margin, and you will recollect her as an example of most gratifying progress from serious disease to convalescence.

When the gingival margin is strongly defined, it is not uncommon to find hypertrophy of the border of the gum, suggesting an analogy to the tightened and deep-coloured skin around the border of the nails, attending even slight degrees of clubbing of the fingers. Of thirty-eight men lately examined in reference to this analogy, twenty-three had the fingers more or less clubbed, and none in whom this appearance was obvious were free from the margin on the gums. Of thirty-eight women, twenty-two had clubbed fingers, and of these twenty-two, only one was without the streak on the gums. The altered aspect on the gums would seem to precede any obvious change in the fingers; ten of the thirty-eight men, and ten of the thirty-eight women, having marginated gums, but not clubbed fingers.*

In some patients, as in M. M., you have seen the gingival margin deep in colour, and more than a line in breadth. Under such circumstances, patches of a similar colour are occasionally observed in the mucous membrane, at a short distance from the lower incisors, particularly where the mucous membrane of the lip is

* I am indebted to the courtesy of my colleagues, Dr. Hamilton Roe and Dr. Cursham, in allowing me to avail myself of their cases in this investigation, so as to extend the field of observation.

reflected on the gums, sometimes also about the roof of the mouth, and inside of the cheeks. In such instances, the disease is usually in the third stage, and the patient's strength rapidly failing, a result to which the co-existence of diarrhœa often contributes. Under more favourable circumstances, with the assistance of soothing and refrigerant remedies, these patches may disappear, and the margin become fainter; but, whether in the early manifestations or the more confirmed conditions, I have never yet observed the line entirely to disappear. In addition to the cases which I have arranged on the table, and recorded in this lecture, I have examined some hundred patients with special reference to this appearance, and the result is in harmony with the deductions to which the tabular view would conduct us.

The greater constancy of the margin in the male patients is remarkable, and the cause not easy to assign. The habit of smoking was at first suggested as a possible explanation, but I have occasionally noticed the absence of the line in consumptive patients addicted to this habit, and have repeatedly found it present in those who do not smoke.

Habits of cleanliness are not a preventive. The margin under consideration may usually be distinguished from the irregular discoloration occasioned by the irritation of accumulated tartar. The discoloration thus induced is commonly rather livid, and the border on which it appears ragged or uneven. In such instances the presence of the line around the gums, where tartar is not deposited, and its continuance after scaling the teeth (an operation which my ingenious friend Mr. Harrison has been so obliging as to perform

in some uncertain cases with a view to settle the question,) may conduct us to a positive conclusion.

A large proportion of our hospital patients are the subjects of advanced disease, and afford, therefore, little opportunity of exhibiting to you a very common appearance at the early period of the disease, I mean a delicate, pearly, transparent aspect of the border of the gums, probably in part the result of fineness of structure. When congestion of the membrane, from whatever cause, occurs in such individuals, the red line may be expected to appear, but it probably varies in vividness in the same individual, under circumstances which modify the circulation, or produce congestion of the mucous membrane; but I believe the pearly condition to be very significant and peculiarly valuable, as occurring frequently at a very early period of disease, and not liable to the fallacies with which shades of colour may be associated.

It seems reasonable to inquire how far the activity of the catamenial function might lessen the tendency to the formation of the streak in women. In the list before you this point is recorded with a view to this question: whilst on the one hand I met with a considerable portion of marginated gums in patients with the catamenia regular, on the other hand I found a large proportion without the margin amongst those with whom the catamenia were irregular or absent. The instances under our notice are, as you may observe on reference to the table, equally inconsistent with any idea of the existence of a connexion between liability to the production of the margin, and hereditary predisposition.

You may desire to hear some conclusions in the way of theoretical explanation. I approach this part of my subject with hesitation, and offer any hypothesis, more with a view to indicate a line of inquiry than as qualifying in any way the mutual relation of the facts. Let me then mention, what indeed you have had an opportunity of observing—first, that the margin has been found broadest and deepest in tint, and most extended as respects the number of teeth encircled, in cases where diarrhœa, or other symptoms, indicated the existence of a state of erethism of the intestinal mucous membrane; and secondly, let me remind you that in the opinion of some eminent pathologists, blood affected with tuberculosis has a peculiar affinity for oxygen. Any tendency to congestion, which may be supposed to be habitual at the reflected edge of the gums, would probably be increased by the concurrence of intestinal irritation; and the atmosphere, if capable of modifying the condition of the blood partially stagnant in superficial vessels, might be expected to take most effect in situations most decidedly exposed to its influence. Consistently with these views the streaked gingival margin might be considered to depend essentially on tubercular depravation of the blood, and a consequent change in its relation to atmospheric influence! When the mucous membrane of the mouth is free from congestion, a greater degree of deterioration of blood may be required in order to induce the appearance under consideration; but when the circulation in this membrane is, from any cause, interrupted, the streak may be expected to occur at an earlier period in the progress of phthisis, and soon to become strongly defined. The

more constant presence of the symptom in men than in women, is favourable to this explanation; the habits of men, especially among the lower orders, being in various respects more calculated than those of women to induce disorder of the mucous membrane.

The question naturally occurs, whether any peculiarities of constitution or temperament tend either to prevent or to promote the formation of the margin. Such an inquiry is indeed suggested by considerations connected with the analogous phenomenon of a streak on the gums, occasioned by the absorption of lead, and which is often absent in persons who are nevertheless suffering from the introduction of that poison into the system. The want of constancy in the development of the blue line under these circumstances, may probably, however, be attributed to differences in the secretions of the mouth. There is indeed good reason for believing that considerable modifications in this respect may be referred to different degrees of care and cleanliness in the management of the teeth; but as respects the phthisical margin there are not sufficient grounds for concluding either that peculiarities of temperament increase the liability to the formation of the streak, or that varieties of habit as to cleanliness, determine its manifestation, although they may contribute to its extension. It is not improbable that characteristic markings may be discovered in the same situation in various other diseases, but materially different from the streak or border described in this communication. M. Fredericq, whose remarks* induced me to pursue this investigation, states that "a broad, dirty, livid streak

* Medical Quarterly Review, for 1850, p. 539.

on the gums, opposite the lower incisors, and sometimes the upper also, is common in amenorrhœa and abdominal affections, and a white streak in the scrofulous." He is of opinion that "a somewhat narrower streak occurs in phthisis, and constitutes one of the earliest signs, often coming on about the same period as the cough, the colour of the streak being brick-red in inflammatory phthisis, but bluish in the less active form, especially in pneumonorrhagia." Some of these statements are not in perfect harmony with my own observations: for as regards the margin, when distinctly assuming the character which I have here described, there seems to be no evidence of its occurrence in other diseases; and I have taken some pains, in hospitals and elsewhere, with a view to ascertain whether a similar margin was present in other instances of chronic disease.

Hitherto, whenever any patient has exhibited the line *clearly defined*, whatever may have been the prominent complaint, a careful examination of the chest has led to the detection of phthisical disease. Let me give you an example. Among the out-patients at the Middlesex Hospital, is a woman entered as affected with dyspepsia, and in whom the streak was obvious, I found the clicking rhonchus characteristic of softened tubercle; and my friend, Dr. Alexander Stewart, being satisfied as to the existence of this sound, on referring to his notes, informed me that at an earlier period he had detected prolonged expiratory murmur in this patient, and had entertained suspicions that phthisis existed. Many similar instances have occurred to me in the course of the inquiry. You are not likely to mistake the redness of gums induced by mercury or

iodine for the phthisical mark. Independently of other circumstances, the discoloration in such cases is more widely diffused, or if it assume in any degree the appearance of a border, it does not so directly merge in the natural tint of the adjoining membrane. As respects the value of this indication in prognosis, I think you will find it a general rule that the early appearance of the streak is an unfavourable circumstance; in cases in which this occurs tending to proceed more rapidly than those in which the streak is absent; whereas freedom from the streak, even in the third stage of the disease, has been particularly noticed in those patients in whom the results of treatment have been most encouraging. Breadth of the discoloured margin, and its extension around the molar teeth, you may regard as affording unfavourable indications.

In reference to diagnosis, there is reason to believe,—

1st. That the absence of the streak in men affected with inconclusive symptoms of consumption may incline you to a favourable interpretation of any such suspicious indications, but that in women rather less weight is to be attributed to this negative sign.

2ndly. That the presence of the sign in women is almost conclusive evidence of the existence of the tubercular element in the blood.

When in either sex it coincides with a pulse not materially altered in frequency by change from the sitting to the standing posture, the presence of phthisis may with high probability be assumed, even before having recourse to auscultation.

The degree in which this appearance exists is not without importance in relation to treatment. When, for

instance, the margin is considerable in extent and intensity, it is often advantageous to administer refrigerant remedies, especially salines combined with prussic acid, as a preliminary to the employment of cod-liver oil, or any tonic measures or stimulating diet; and when, as often occurs, diarrhœa accompanies this condition, trisnitrate of bismuth is specially useful. There is reason to believe that the presence of the streak, in some instances, indicates the existence of a tubercular taint in the constitution, before any signs of such a condition can be detected in the lungs. When the streak is absent, whatever be the pectoral symptoms, we have at least one ground for assuming that the constitution is not extensively involved, and we may hope to be able, by the administration of suitable remedies, to promote healthy nutrition, and avert or retard the establishment of phthisis.

When consumption exists in any individual, every structure is prone to partake of the disease, and various circumstances may modify the extent to which the lungs are affected. Even if it were practicable to replace disorganized lung with healthy tissue, yet if the blood remained deteriorated, and the processes of nutrition defective, the fatal issue, although deferred, would be equally certain: any particular which seems calculated to assist our judgment regarding the constitutional condition is therefore entitled to attention. I readily acknowledge that extended observation is required, in order to determine the qualifying circumstances to be regarded in fixing the exact value of the sign which I have now commended to your attention; and this object will be promoted by a due regard to

the suggestions of minds more apt to detect objections than to perceive evidence; avail yourselves, therefore, of such assistance, whilst steadily aiming to attain a habit of seeking truth with an unprejudiced and discriminating mind.

Should furthur investigation confirm the opinion which I have ventured to express regarding the significancy of the mark on the gums, the facility with which the symptom can be observed must tend to enhance its practical value, whilst its physiological relations suggest a wide and instructive range of inquiry, and serve to impress the important truth, that consumption is not exclusively, or even essentially, a local disease, but rather a constitutional condition, requiring for its satisfactory elucidation and successful treatment far more than an acquaintance with the science of auscultation.

LECTURE XI.*

Diseases presenting some symptoms resembling those of consumption, asthma, cancer—Consolidation from chronic inflammation—Hysterical affections simulating phthisis.

THERE are at present in the wards of the hospital several patients who were supposed by their friends to be consumptive, but in whom the reasons for suspecting the existence of such disease are by no means conclusive. These patients may serve to illustrate a class of cases requiring much care in their discrimination. The responsibility incurred in speaking decidedly respecting the nature of some of these conditions is so considerable, that a few suggestions on the subject may not be unseasonable.

A few years since it was not uncommon to find cases of asthma, especially when occurring in debilitated subjects, and associated with chronic bronchitis and copious expectoration, mistaken for phthisis. It is unnecessary on this occasion to expatiate on the distinctions between these conditions. Some remarks in reference to such diseases were made in the introductory lecture; and you are sufficiently acquainted with the physical signs

* This Lecture did not form a part of the course in 1851, but was delivered subsequently.

to avoid confounding them together. Infiltrated cancer of the lung, in consequence of the marked dulness and increased resistance on percussion by which it is accompanied, sometimes suggests the idea of tubercular affection; but various circumstances will assist you in forming a diagnosis, such as the aspect and previous history of the patient, and particularly the state of the pulse, which, as in a patient lately in the hospital, may be considerably slower than is usual in health. A pulse preternaturally quick is seldom associated with cancer of the lungs, excepting as the result of anæmia, or intercurrent inflammation. When the pulse is quick in consequence of anæmia, it contrasts with the pulse of the consumptive by the great range of its variations under changes of posture. When, in addition to the particulars above specified, you observe among the attendant symptoms a peculiar expectoration resembling prune juice, or currant jelly, fulness of the superficial veins on the affected side of the chest, induration of the cervical glands, œdema of the arms, or of the face, with protrusion of the eyeball, all ambiguity respecting the existence of cancer is removed.

The cases which you will probably find it most difficult to discriminate are—first, those of partial consolidation of lung, occurring in delicate individuals as a result of chronic inflammation; and secondly, instances of limited congestion in the chest of hysterical subjects. Patients affected with the first of these conditions often remain for a long time without material change, irrespectively of treatment, and even gain weight.

C. M. affords an example of this affection. He is a delicate nervous subject, and his apprehensions so

much exceed the absolute indications of disease, that you might at first sight be inclined to regard his complaints as fanciful; but, on percussion over the apex of the right lung, you may detect some dulness, which will be more obvious if you compare the sound on the two sides during full inspiration as well as expiration; the difference in clearness of the percussion sound during full inspiration, as compared with that during expiration, being much greater on the left side than on the right. At the end of inspiration, you may observe slight pleuritic rubbing sound at the upper part of the right side of the chest. This patient has been a tavern waiter, and has led an irregular life. His sleep is much disturbed, and his countenance has an expression not unlike what is observed at the commencement of delirium tremens. The pulse varies greatly from change of posture; and, in the absence of any constitutional symptoms of a phthisical character, although the seat of the local mischief might suggest suspicion, it is reasonable to hope that the deposit is not tubercular. In such instances when, as in this patient, the history is incomplete, especially as regards the appearance of the expectoration, and the indications afforded by auscultation, you will sometimes find it prudent to avoid expressing a positive opinion until the progress of the case, and the effects of treatment, assist your diagnosis. The improvement of C. M. is proceeding so rapidly, under a soothing and cautiously tonic plan, as to confirm the impression that he is free from tubercular disease.

Let me now more particularly invite your attention to a source of fallacy, which you will not find clearly

defined in systematic treatises; namely, the occurrence of a sort of pseudo-phthisis in hysterical subjects. The hospital affords some examples, but it is in private practice that such cases are most frequently encountered. There is scarcely any part, the function of which hysteria may not disturb so as to excite the suspicion of organic disease, and there is probably no class of cases in which errors of diagnosis are more frequent. You will scarcely be prepared to expect that even pulmonary consumption is included in the list of diseases which this Protean malady may simulate or complicate; but patients are continually presenting themselves affected with debility, disordered digestion, and variously impaired health; and who consider themselves consumptive, because they are getting weak and thin, are teased with cough, and with uneasiness in what they call the chest. Other individuals, in many respects answering to this description, preserve their plumpness, and it is among such patients that the hysterical condition is usually most decided. With a little attention, such instances can, for the most part, be readily distinguished from those of true consumption. The cough, instead of being short, irregular, and attended with more or less expectoration, is loud, barking, urgent, and dry. The breathing is more hurried than is proportionate to the local signs of pulmonary affection; and the somewhat loquacious complaints of varied disquietude are often amusingly inconsistent with a countenance either expressive of indifference, or animated with sprightliness; there is often a drooping appearance of the upper eyelid, and the aspect altogether is very different from the settled demeanour usually observed

in the phthisical, which may be either gloomy or cheerful according to the temperament of the individual. Pain under the left mamma of the peculiar character pathognomonic of hysteria, sometimes suffices to determine the question. The spot in the middle of the sternum, which is naturally endowed with much sensibility, is often acutely sensitive to pressure; and, if pressure be made at the same time upon this part, and near the spine between the shoulder blade, the peculiar gasp and sense of suffocation, to which the term of hysterical asthma has been given, may be induced. But, among the most remarkable symptoms usually characteristic of phthisis, which may occur as a result of hysterical condition, hæmoptysis may be specially noticed. It is in such cases often profuse, and remarkably periodical in its occurrence, yet, partaking of the capriciousness of hysterical symptoms. The profuseness of hæmoptysis in some hysterical subjects may possibly be due to deficiency of crassamentum in the blood; a condition similar to that produced by Prevost and Dumas in cats, and by Le Canu in men, by blood-letting. If Le Canu be correct in the opinion, that the blood of women contains on an average, in a thousand parts, about thirty more of water, and proportionally less crassamentum than that of men and that this peculiarity is most observable at the catamenial period, we may perhaps approach to an explanation of the greater liability of the female sex to the occurrence of hæmoptysis, irrespective of consumption.

With a view to bring the different parts of the subject more prominently before you, I will briefly relate a few illustrative cases.

I lately saw Miss L., a lady aged thirty years, complaining of pain of the left chest extending to the arm, of dry cough, and occasional clear hæmoptysis. There was slight dulness on the left side posteriorly. The catamenia were three weeks behind time, but the pulse was only 72. The dulness on percussion had previously been observed on the right side, which on the occasion of my examination was clear; and I could not dismiss from my mind the impression, that the direction of the patient's attention to the suspected part led to congestion which proved transient. There was no evidence of pleurisy, but there was a rather significant pain under the left mamma, and an expression of countenance suggesting the conclusion, the correctness of which was confirmed on inquiry, that the patient was labouring under mental disquietude. Removal to the country proved beneficial. The patient's health gradually improved, the auscultatory signs became chiefly negative, nothing in this respect being observable but slightly prolonged expiratory murmur on the left side. There is still, however, a little cough, and occasional hæmoptysis. It will be remembered that the catamenial function is slightly disturbed; and pulmonary congestion from this cause may be sufficient to occasion dulness on percussion. This case might by some be regarded as threatened phthisis, but I am rather disposed to view it as hysteria depending on mental causes, and to refer the local congestion, in some degree, to a direction of the mind towards the parts temporarily affected. It presents no conclusive evidence of the presence of phthisis, and, under favourable circumstances, such disease will probably never occur. The next ex-

ample presents the two conditions of hysterical and phthisical predisposition, in some degree combined.

Not long since, I received from a medical friend a note to this effect: "My wife is very poorly, her family have for the most part died consumptive; please come and see her." I found a lady, aged twenty-four years, without either the languor, or the unnatural keenness of expression common in established phthisis, complaining of pain under the sternum, increased by deep inspiration. There were increased vocal fremitus, dull percussion sound under the right clavicle, and bronchophony in the right suprascapular region. She was said to be getting thin, and her gums had the pearly border. Dry cupping, and an expectorant mixture were prescribed. The next day she was as before; dry cupping had afforded no relief. Pulse 120; respirations 70 in a minute. Inspiration difficult and painful. The respiratory uneasiness was increased in paroxysms, and she walked about the chamber sighing. I prescribed a mixture containing cajuput oil and tincture of hops, to be taken every three hours; for the great disproportion between the urgent complaints and the slight auscultatory phenomena, convinced me that the case must be treated more as nervous than as organic. After using the mixture, she slept about six hours, but on the next day was still troubled with fits of unquiet breathing; and pressure on the sternum produced pain about her spine, between the scapulæ. Compression of both these points at once occasioned much uneasiness and alarm. The patient was evidently impressed with the idea that her life was in danger; but I succeeded in dispelling her fears, and she smiled when I said, 'It is a very in-

teresting little complaint, and I must make a note of it.' I now ascertained that this lady had been long affected with profuse leucorrhœa; and it was evident that the respiratory disturbance was a "climbing sorrow," and that its element was below. I recommended a draught of sulphate of zinc, with infusion of valerian, three times a day, and an opiate embrocation to the spine.

Oct. 20th. I again saw her. A visit to the country, and the administration of zinc had been useful. The pulse was 88. Respiration apparently natural, but she complained of seeming to have nerves in the left side, which suffered severe pain when the breathing reached them. No tenderness of spine, and very little of sternum. Voice more resonant on the right than on the left side; but percussion here not distinctly dull, and expiration less obviously prolonged.

Among the circumstances worthy of attention in this case are, first, the temporary hysterical aggravation of pectoral symptoms, especially manifested by distressed respiration, and local uneasiness; secondly, the disappearance for a time of consumptive symptoms, although there may be ground for apprehending that phthisis may ultimately be established.

The next case exhibits the hysterical temperament aggravating hæmoptysis and cough, without increasing the danger or accelerating the progress of disease. E. B., a young woman in the hospital, aged sixteen years, of sanguine temperament, who had lost her mother, uncle, and two maternal aunts by phthisis, came under my observation at Christmas, 1850. She had suffered from cough for fourteen weeks; at first dry, subsequently attended with expectoration. Lately,

on awaking in the morning, she had found blood flowing from her mouth; the bed clothes were soaked with it, and about a pint was supposed to have been lost. After this there was no hæmoptysis during the day, but for a fortnight, about three ounces of blood were coughed up every night. During a part of the progress of this case vomiting occurred, and was so obstinate that chloroform inhalation was required to check it; and the cough was for some days and nights almost incessant, and very distressing. There was dull percussion sound under the right clavicle, and the expiratory murmur, on both sides, was prolonged. Antimony, digitalis, purgatives, and astringents, used in succession, exercised but a slight effect on the hæmoptysis. Turpentine, employed in draught and inhalation, moderated it, but was followed by strangury. The catamenia, being interrupted, lytta was given, and proved useful. This patient's case is an illustration of phthisis, rendered more urgent in symptoms, but not accelerated in its progress, by hysteria. Leucorrhœa of some years' duration, and very irregular, and often profuse catamenia, constituted a part of the history. She was benefited by treatment, and gained six pounds weight in three or four months.

The next case I have to introduce is that of S. G., a young woman, also in the hospital, a dressmaker, aged twenty-three years, with dark hair, and hazel eyes. You may observe her alert expression, as though on the watch for sympathy. She is affected with pain under the right clavicle, but is tolerably plump, and without clubbed fingers, or lines on the gums. Among other symptoms may be enumerated dyspepsia, cough, dyspnœa,

headache, nausea, and mucous expectoration with black pigment. The pulmonary expansion is deficient, but there is no bronchophony, or increased vocal fremitus. A systolic murmur may be heard at the mitral apex. Two years since, she coughed up half a drachm of blood every morning for a week, not at the catamenial period; but latterly only streaks. There is a slight murmur over the right jugular vein. And here I may incidentally remark that, according to my observation, the venous murmur occurs less frequently in consumptive patients than in those debilitated by other diseases; and that, as a general rule, those cases of consumption in which it is observed are apt to proceed more favourably than others. This young woman had been an invalid for four years, suffering from gastrodynia, palpitation, and slight cough; and had been treated with valerian, steel, and a host of other nervine medicines including sumbul. In July, 1850, she came under the care of my friend Dr. Cotton, at which time she was affected with weak respiration, some dulness on percussion in the right side, and marked hysterical symptoms. In 1851 there was some dulness in the right suprascapular region. The hysterical symptoms are now less marked, but the dulness on percussion in the right side is undoubted. Phthisis has probably set in, but seems to be kept in check by the treatment.

In this case, as in that of Miss L., first narrated, the dulness on percussion, although during the last three months too well established, seemed at an early period observable, sometimes on the one side, sometimes on the other; and I cannot help suspecting that alternations of this sort may be induced by what I would ven-

ture to designate hysterical congestion. Irregular congestions of various parts and organs, I believe to be no unusual concomitant of hysteria, especially when amenorrhœa is associated with it; and I would propose the inquiry whether hypertrophy of the breasts and other parts, as occurring in hysterical subjects, may not have relation to conditions of this kind.

C. S., a patient at present under my care in Rose Ward, suffering from uterine irritation and extreme sensitiveness of the skin, was six weeks since affected with transient albuminuria, and recently with swelling of the calves of the legs, which did not pit on pressure, being of the kind to which the Germans apply the term anathymiasis, and so considerable as to lead her to attribute to it an increase of weight of some pounds, really due to the administration of cod-liver oil.

And here a question occurs, philosophically and practically of great interest; namely, how far hysterical congestion may be induced by certain directions of consciousness. We know that cramp may be renewed by direction of the attention to the part affected; and that expectancy of other actions, or a morbid election of them may occasion their return. Does this line of inquiry suggest an explanation of the fact, that nervous conditions may assume the character of real disease? On this tempting field of speculation I shall not further enter,* but briefly recapitulate the conclusions to

* Interesting and philosophical observations, having reference to this subject, may be found in "A Treatise on the Nervous Diseases of Women," by W. S. Laycock, M. D. London, 1840: and in an Essay "On the Pathology and Treatment of Hysteria," by R. Brudenell Carter. London, 1853.

which I am conducted, by the consideration of such cases as those which we have been investigating.

1st. That, in patients not affected with tuberculosis, hysteria may induce many symptoms and even local signs, much resembling those of phthisis.

2nd. That, when phthisis exists in hysterical subjects, some of its symptoms are often aggravated, to an extent disproportioned to the amount of organic change.

3rd. That, as phthisis advances, hysteria usually retreats, so that the presence of hysterical symptoms may encourage a hopeful prognosis, pretty much in proportion to their severity; hysteria and phthisis, although not incompatible, being apparently uncongenial. To this rule, hysterical affection of the joints is perhaps an exception, for I have occasionally known hysterical hip complaint continue at advanced periods of consumption.

4th. That, when hysteria and phthisis are associated, the treatment serviceable for the one disorder tends also to relieve the other; excepting that exposure to the air, and other parts of a hardening treatment, are available to a greater extent in hysteria than in cases of established consumption.

LECTURE XII.

Causes of consumption: 1. Hereditary tendency; influence of this cause as modified by sex, &c.; 2. Bad air; 3. Dissipation; 4. Mental depression; effects of climate—Value of the respirator—Importance of muscular exercise—Mental causes of disease under our control.

THE attention which you have given to the consideration of the diagnosis and treatment of consumption, will not, I am sure, gentlemen, be withheld from a subject of perhaps paramount importance, affecting us personally as well as professionally,—namely, the causes of the disease.

I place before you a tabular view of the consumptive patients at present in my wards; in order that you may compare their history in relation to this question of causes.

The first of the causes to which this tabular statement directs our attention, is hereditary influence. There is, perhaps, no disease respecting which this influence is better established; and it peculiarly claims our attention in consequence of the power, which the existence of such a proneness implies, to perpetuate the effect of those primary causes which might otherwise prove temporary, and be restricted to the individual directly exposed to their agency. This influence may be traced much more frequently in women than in

TABLE RELATING TO THE CAUSES OF CONSUMPTION.

WOMEN.

Name.	Age.	HEREDITARY PREDISPOSITION.								Employment and other particulars.
		Father.	Mother.	Brothers.	Sisters.	Uncles.	Aunts.	Grandfather.	Grandmother.	
H. D.	35	--	--	--	--	--	--	--	--	Milkseller: much mental disquietude; parents not consumptive.
M. B.	26	--	--	--	3	--	--	--	--	Servant.
M. M.	29	--	--	--	--	--	--	--	--	Dressmaker: confined air; much fretting; parent living; good diet.
C. V.	20	--	--	--	--	--	--	--	--	Barmaid.
M. A. F.	32	--	1	--	--	1, (paternal.)	2 (maternal.)	--	--	Servant.
S. A. B.	18	1	--	--	--	2, (paternal.)	--	1, (paternal.)	1, (paternal.)	Servant.
M. A. B.	16	--	--	--	1	--	--	--	--	Dressmaker.
M. M.	29	1	1	--	2	1, (paternal.)	1, (maternal.)	--	--	Servant: always delicate.
L. D.	21	--	--	1	1	--	3, (maternal.)	1, (paternal.)	1, (paternal.)	Servant: always delicate.
S. A. M.	16	1	1	--	2	--	--	--	--	Orphan Asylum: wet feet.
F. R.	19	--	--	2	--	--	--	--	--	Needlewoman: diarrhœa at commencement.
M. W.	18	--	--	--	--	--	--	--	--	Servant: disease not established.
M. B.	17	1	1	1	4	--	--	--	--	Servant: all her immediate family, excepting brother, phthisical.
E. H.	33	--	1	3	3	--	--	--	--	Dressmaker.

TABLE RELATING TO THE CAUSES OF CONSUMPTION.

MEN.

Name.	Age.	HEREDITARY PREDISPOSITION.								Employment and other particulars.
		Father.	Mother.	Brothers.	Sisters.	Uncles.	Aunts.	Grandfather.	Grandmother.	
W. K.	46	1	..	..	1	..	..	..	..	Groom.
E. H.	18	..	..	..	..	..	..	..	..	Groom: parents healthy.
P. D.	37	..	..	..	..	..	..	..	..	Gardener: deficient food; hard work; parents not consumptive.
W. U.	32	..	..	..	..	..	..	..	..	Wine-porter: close cellars; syphilis.
A. S.	37	..	..	..	..	..	..	..	..	Tailor.
W. J.	14	1	..	..	..	..	..	1	..	Slept in room with broken window.
J. L.	34	..	..	..	..	..	..	..	..	Soldier: gonorrhœa; syphilis; ague.
W. H.	34	..	..	..	..	1 maternal.	2 paternal.	..	..	Servant: gonorrhœa; syphilis.
G. S.	29	..	..	..	..	..	..	..	..	Fishmonger: gonorrhœa frequently; syphilis six times.
C. B.	47	..	..	..	..	..	..	..	..	Tailor.
J. E.	30	..	.	..	..	..	..	..	..	Wine-cooper: much night work; syphilis: some hours in rain after debauch.
W. G.	42	..	..	..	..	..	..	..	..	Post-boy: long in wet clothes.

men; partly, perhaps, in consequence of their being exposed more commonly to the same class of inducing causes as their parents. The apparent difference may possibly be greater than the real one, owing to a more exact acquaintance on the part of woman with what may be called the medical history of their parents; but this qualification will not explain one of the interesting results indicated by the table, and confirmed by more extended observations,—namely, that the hereditary influence tends peculiarly to extend in the sex in which it first appears. Thus, of the thirteen women on the list whom I have carefully questioned respecting this point, three have lost both father and mother, two their mother only, one the father alone; and in the medical report of the hospital, you will find the same conclusions deduced from a large scale of observation.

If any of you doubt the existence of hereditary tendency as a frequent cause of consumption, I would refer you to that report, where you will learn that amongst 1,000 patients questioned on this subject, about a fourth mentioned having lost a parent from consumption; whereas, in more than 4,000 patients in lunatic asylums, the occurrence of disordered mind in either of the parents was ascertained only in one-eighth. We may often observe in families, that the members in whom the hereditary tendency is most apt to betray itself, are those characterized by refinement of feeling, and delicacy of sentiment. Selfishness and hardness of character,—with an aptitude for jostling with the world,—are qualities which seem to indicate firmness of structure, and less frequently present them-

selves in persons susceptible of this form of disease. The common expression, "Too good to live," may so far have a foundation, and the poet may be justified in his exclamation,—

> "The good die first,
> And those whose hearts are dry as summer dust
> Burn to the socket."*

It is common to attribute the prevalence of consumption in Britain to vicissitudes of weather. Even if it were proved that Britain is more afflicted with this disease than other countries in which the temperature is more uniform, it would be unsafe to refer the circumstance to this particular cause. A fair amount of exposure to the weather appears to me rather calculated to avert, than to induce consumption. It is only in cases of prolonged exposure to wet and cold, that we can expect to trace any evidence of connexion between this physical cause, and the first manifestations of the disease.

In pursuing such inquiries, it is difficult to separate the relative influence of causes which are commonly found in combination, and the table contains several examples of this difficulty; but, as respects the grooms and the post-boy on our list, I have not been able to ascertain any particular circumstances in the way of dissipation, or deficient food, and am inclined to refer the establishment of the disease to their having been for a considerable time exposed to cold. Rapid transitions, and short continuance of cold and heat, are comparatively inoperative; but, as before remarked, the

* Wordsworth's Excursion, Book I., line 503.

prolonged application of cold, particularly in the form of wet clothing, of which the case of W. G., the post-boy, affords an instance, is peculiarly apt to depress vital energy, and induce congestion, with its incidental perils. W. T. suffered from exposure to a long-continued current of cold air; but in him the hereditary liability must also be taken into account.

You will be quite ready to believe that confined and deteriorated air tends materially to the production of consumption. Assuming such to be the fact, you would expect tailors, printers, and journeymen bakers, to suffer in a high degree. Let me adduce illustrations of the reasonableness of these expectations. E. S., the patient now before you, with a most unhealthy aspect indicative of some serious organic disease, has moist crepitation (clicking,) over nearly the whole of the right side of the chest, showing the rapid extension of tubercular disease. He is a tailor, and has been accustomed to work with forty others, in a room of small dimensions and badly ventilated. He has no hereditary tendency to the disease; but his brother, who used to work in the same room, died lately in this hospital. You will find, from the report of the medical officers of the institution, that tailors constitute 7·2 per cent. of our male patients. They are also, unhappily liable in so high a degree to many other diseases, that they have been found to constitute 5·8 per cent. of the patients at a general hospital. When you consider how small a proportion tailors form of the whole male population, you will be the more impressed with the unfavourable tendency of the circumstances to which they are exposed, in rendering them so peculiarly prone to disease.

W. R., the delicate patient whom I next introduce, has profuse night perspirations; and you find, from the marked cavernous cough under the left clavicle, that he has a large vomica in that situation. A cavernulous cough at the apex of the right lung proves that in that side also a cavity is forming. His age is twenty-six. He has no hereditary title to consumption, but is one of a family of eight all living. His food and clothing have always been good; but he is a compositor, and has worked in a close room, cold during the day, "like an oven at night." His cough began after unusually hard work three months ago; you see how rapidly he is failing. There is reason to believe that in this metropolis there are not above a third as many printers as tailors; yet among the applicants at our hospital their per-centage is half that of tailors, and their liability to consumption appears to be four times as great as to other diseases. In the course of his meritorious investigations* regarding the causes of disease, Dr. Guy was led to the conclusion that the relative liability to phthisis of pressmen and compositors materially differs. During a long period of observation, the proportion of pressmen applying at King's College Hospital on account of consumption was a fifth, while the proportion of compositors amounted to a fourth. The wages of the compositor being higher, and his habits fully as temperate as those of the pressman, we have to seek the cause of his greater proneness to the disease; and the only sufficient explanation which presents itself is the want of muscular exercise. Exertion

* On the Influence of Employments on Health and Disease. "Quarterly Journal of Statistical Society." Vol. vi., pp. 197 and 283.

of the arms may, with the pressman, to a certain extent counteract the effect of confined air. This explanation is in perfect harmony with observations some years since published by Lombard and Benoiston, regarding the power of exertion of the arms in counteracting consumptive tendencies.

You perceive that five of the men on our list have suffered much from syphilis. To the influence of this disease, with all its depressing effects, and perhaps also to the mercury employed for its cure, I have often traced the commencement of consumption. In J. L., the soldier, these circumstances probably contributed their share in producing the pulmonary disease. Is it to dissipation that we are to attribute the remarkable liability of soldiers to consumption? Even the dragoon guards, who in a sanitary point of view are more favourably circumstanced than many other divisions of our army, suffer annually a mortality of ·63 per cent. from consumption; while the mortality of the male population of England and Wales from the same cause is only ·37 per cent. At first sight it is probable that the cause just noticed would be suggested in explanation; and I am ready to allow that, although our gallant soldiers are above fear, they are not so often as could be wished above reproach; but the comparative immunity of sailors from the disease proves such an explanation to be inadequate. The systematic selection of tall men may have an effect in some regiments; rapid growth being by no means favourable, either in animals or vegetables, to firmness of structure: but, on the whole, the most satisfactory explanation appears to be

that offered by Dr. Duncan,* namely, "the listlessness of their life, and the dull monotony of drills and parades." We are thus conducted to a branch of the inquiry to which I am specially anxious to draw your attention. I refer to the influence of depressing mental emotions as predisposing to phthisis. The terms "breathless anxiety, breathless suspense," are not mere metaphors. The language of inspiration, while pre-eminently adapted for communicating truths as clearly to the untutored multitude as to philosophers, on occasions consistent with this, its universal object, often combines with general comprehensiveness a high degree of scientific accuracy. I cannot deny myself the satisfaction of furnishing a proof of this assertion, by adducing a passage which remarkably illustrates the opinion just expressed, respecting the influence of emotion on the condition of the lungs. I refer to that remarkable expression, occurring in a lament of the afflicted Job,† "He will not suffer me to take my breath, but filleth me with bitterness." If any of you will observe his breathing at the time that any depressing subject is occupying his mind, I think he will be convinced of the tendency of such depression to retard respiration. Any unnatural retardation of the respiratory act must, I conceive, be calculated to produce pulmonary congestion, and to take most effect on those portions of the lungs which in the ordinary condition are most actively engaged. It is true that mental depression has an unfavourable effect on the process of digestion, and may thus predispose to various disorders; but any peculiar

* See an interesting communication to the "Dublin Medical Journal," vol. ix., p. 32.

† Job ix. 18.

influence on the lungs thence arising, cannot readily be explained without some such hypothesis as I have suggested.

H. D. has advanced disease at the upper part of the right lung; there is gurgling cough in front, and crumpling behind. She has no hereditary tendency to phthisis, and although for a long period exposed to vicissitudes of weather, did not suffer from that cause; but four years since, she became a widow, and under various depressing influences disease has been established.

The medical statistics of our prisons afford striking evidences of the influences of depressing emotion.* Dr. Baly has collected particulars regarding the health of prisoners in various parts of this country, and in America; and one of the most important conclusions, which those particulars serve to establish, is the remarkable prevalence of consumption in those establishments, under every variety of climate, diet, and general regulation. This greater liability to phthisis among prisoners, as compared with the ordinary population of these countries, is obviously independent of locality, and can be referred only to some common cause. At the Millbank penitentiary, the mortality from consumption is four times the average in the general population; and it is worthy of remark that, in those who fall victims to the unfavourable influence, the average period for the full development of its effect is about three years.

The interesting question will probably occur to you whether the causes to which I have referred, as tending

* Transactions of the Royal Medical and Chirurgical Society, vol. xxviii. p. 113.

to induce consumption, are equally influential with both sexes. The statistics at our command indicate considerable difference in this respect. In support of this assertion, let me call your attention to the fact that, although in the country at large many more women than men fall victims to consumption, yet in London the mortality of women from this disease is much less than that of men, and their comparative immunity is specially observable in married life; the proportion of married women dying of this disease above the age of twenty-five, as compared with married men, appearing from our hospital report to be as three to five. The physical circumstances of the two sexes in a great city being for the most part similar, we must seek in mental causes for the explanation of this remarkable circumstance; and such are easily assigned. On the one hand, we see man struggling in this crowded metropolis for the support of his family, beset with the wasting influences of anxious care; whilst, on the other hand, we find woman, endowed with more faith and patience (provided she receive her just share of consideration and tenderness,) fulfilling cheerfully the duties of the day, and not so anxiously regarding the morrow. On consulting the return of the Registrar-General, you will obtain confirmation of this view, in the remarkable fact that the phthisical mortality in some provincial cities, as well as in the metropolis, is low for women; but that, in the counties, the proportion is in a very high degree to their disadvantage. An important exception to this rule, as applied to the large provincial cities, is furnished by Leeds, where the excess of female mortality from phthisis is

equal to that which obtains in the kingdom generally. I know not how these differences are to be explained, except by some peculiarities of mental condition; and, in seeking for criteria by which to measure the mental condition of women in different districts, it occurred to me to examine the Registrar-General's returns of the number of illegitimate children born respectively in each of the places which I had entered, as illustrating the contrasted mortality of men and women from the disease under consideration.

I show you the results of this examination in a table deduced from the return for 1838, giving the order of increase in the proportion of female mortality; the per-centage of deaths being in each instance calculated from 100,000 of the population. I have added to the table a column for the per-centage of illegitimate children in relation to the whole number of births; and, although this return is made for a different year, the relative proportion in different places, for several successive years where it is recorded, sufficiently corresponds to exclude any important fallacy in this respect.

	Per-centage of Deaths from Phthisis.		Proportion per-cent. of Illegitimate children to births.
	Men.	Women.	
London, - - - -	·451	·377	3·2
Liverpool and West Derby, -	·595	·571	3·6
Manchester and Salford, -	·549	·548	5·8
Leeds, - - - -	·440	·477	6·0
England and Wales, - -	·378	·408	7·0
Paris, according to Benoiston, -	·208	·408	28·0

I do not intend merely to imply that the mothers of illegitimate children are peculiarly prone to phthisis; but rather that, in the districts where the proportion is high, such a system of morals may be assumed to prevail as must extensively expose the female population to special causes of mental disquietude. The return for Paris, even allowing some deduction for its large foundling hospitals, is remarkably high, and the comparative female mortality of that city from phthisis is singularly predominant. You will agree with me that, in any district most notorious for the number of children born out of wedlock, the women may be assumed to be least happy in condition, most exposed to hope deferred, unrequited affection, bitter ingratitude, and all the causes which tend to wither the heart of those whose life may be said to ebb and flow with their emotions.

With a view to test the correctness of the conclusion suggested by the few examples above given, I subsequently pursued the inquiry more extensively, and calculated from the Registrar-General's return for 1842* the per-centage of deaths from phthisis in about twenty places in England, taken without any grounds for preference, as suitable for comparison; and in the table of particulars a column is introduced, giving the per-centage of illegitimate births in relation to the whole births as registered in the same volume. The order of the places in the list is adjusted according to the excess of female deaths from consumption; and although, as might have been expected, the irregularity of proportion is considerable, the general tendency to diminution

*Sixth Annual Report of the Registrar-General.

Place.	Deaths from all causes.		Deaths from Phthisis.				Excess or deficiency of female deaths from consumption.	Per-centage of illegitimate Births.
	Male.	Female.	Male.	Per-centage of male deaths.	Per-centage of female deaths.	Female.		
Wigan, . . .	835	756	104	12·45	19·44	147	+ 6·99	18·1
Devizes, . . .	217	232	42	19·35	25·00	58	+ 5.65	8·5
Salisbury, . .	140	178	27	19·28	24·71	44	+ 5·43	9·3
York, . . .	557	576	82	14·72	19·96	115	+ 5·24	8·3
North Riding, . .	1,825	1,956	226	12·38	16·66	326	+ 4·28	8·9
Nottingham, . .	688	739	111	16·13	20·02	148	+ 3·89	12·2
Huddersfield, . .	1,060	936	199	18·77	22·31	209	+ 3·54	9·0
Stafford, . . .	226	203	25	11·06	14·28	29	+ 3·22	7·1
West Riding, . .	12,851	12,218	1,934	15·04	18·16	2,220	+ 3·12	7·1
Chesterfield, . .	438	416	71	16·21	18·26	76	+ 2·05	7·8
Taunton, . . .	306	303	52	16·99	18·81	57	+ 1·82	5·5
Leicester, . . .	749	708	172	22·96	24·43	173	+ 1·47	6·2
Canterbury, . .	162	172	26	16·04	17·44	30	+ 1·40	7·7
Lancaster, . .	409	366	56	13·69	14·48	53	+ 0·79	8·0
Scarborough, . .	197	219	27	13·70	14·15	31	+ 0·45	5·0
Exeter, . . .	373	391	66	17·69	17·64	69	— 0·05	3·2
Swansea, . . .	335	339	80	23·88	23·00	78	— 0·88	4·0
Bristol, . . .	900	871	123	13·66	12·51	109	— 1·15	4·5
Bath, . . .	756	844	142	18·78	18·06	145	— 1·72	6·0
Birmingham, . .	1,829	1,749	384	20·99	17·32	303	— 3·67	4·1

of the figures in the last column, conjointly with corresponding reduction in the female mortality, is deserving of notice. In the last five towns the per-centage of female mortality is below that of the males, and is marked with the minus sign. Several contrasts, as for example between Birmingham and Nottingham, exhibited by the table, will probably attract your attention. Various local peculiarities connected with climate, the kind of occupation, and the degree of education, must doubtless modify the results; but extended investigation deepens my impression that the circumstance to which I have specially alluded, is an important element, and at least one criterion of the conditions tending to swell the female mortality.

I place in a separate table four towns, which present remarkable peculiarities not in harmony with the usual rule:—

Places.	Deaths from all causes.		Deaths from Phthisis.				Plus or Minus of Female Deaths.	Illegitimate Births.
	Males.	Females.	Males.	Per-cent. of Male Deaths.	Per-cent. of Female Deaths.	Females.		
Stroud -	327	383	49	14·98	25·58	98	+10·6	7·4
Shrewsbury	289	297	69	23·87	19·52	58	— 4·35	9·7
Lincoln -	355	343	48	13·52	20·99	72	+ 7·47	6·7
Carlisle -	415	425	72	17·34	14·35	61	— 2·99	10·0

The great excess of female deaths from phthisis at Stroud and Lincoln, and of male deaths from the same cause at Shrewsbury and Carlisle, is a circumstance well entitled to special investigation.

I extended a similar inquiry into the county statistics, but the results were not sufficiently definite to require detailed notice on this occasion. It may be sufficient to mention that Essex, Herefordshire, and Norfolk, were among the counties most remarkable for female mortality from phthisis; whilst in Cornwall and Cumberland the excess of phthisical mortality is remarkably on the side of the men.

Whatever interpretation, as respects the question which I have proposed, may be attempted of the facts thus presented, there can be no doubt that the tables supply some interesting materials for reflection, in reference to the causes of consumption. Whilst, on the one hand, I cannot doubt the influence of mental depression in conducing to the establishment of phthisis; on the other hand, I cannot resist the force of evidence that cheerful impressions have considerable power in retarding the progress of the disease. I have observed that, on the whole, the patients improve more rapidly, and even that the mortality is less considerable, in the large wards under my care in this hospital, than in the small; although the space allotted is proportional to the number of patients admitted. Such a result is very different to what we observe in diseases associated with morbid poison, and even in epidemic disorders, such as influenza, in which the existence of any special virus is disputed. I may add that the favourable influence of cheerful associations has been most apparent among the female patients.

I would further remark that women, perhaps in consequence of some constitutional peculiarity, bear confinement to the house in phthisis, as well as in some

other diseases, better than men; while men, with certain precautions, seem even in established phthisis to be the better for out-door exercise. Such a general statement requires, no doubt, to be accepted with due qualifications; and some discrimination is requisite to determine in any given case, whether exercise in the open air is safe and desirable. In cases which partake of an inflammatory character shelter is usually requisite; but in those which are characterized by a relaxed and debilitated condition out-door exercise is useful. In the recommendation of climates as appropriate to particular patients, I cannot but think that undue importance has been attached to trivial differences of temperature; and that the idea of special physical advantages assumed to belong to sea-side situations, owes its support more to prejudice than to evidence.

It is worthy of consideration, especially in prescribing for the class of patients before us in this institution, that much of the advantage anticipated from a change of climate may be secured by the use of the respirator. This ingenious contrivance, (for which we are indebted to Mr. Jeffreys, an accomplished member of our profession,) by means of a suitable arrangement of metallic bars, allows of a free admission of fresh air, which at the same time it tempers and warms. It is important to remember that respirators may be required of different warming powers, according to the temperature of the season; that the medium power, adapted to raise the temperature thirty degrees, is appropriate when the thermometer ranges from thirty to forty degrees; and that the low power, which raises the temperature fifteen or twenty degrees, may be advan-

tageously substituted when the thermometer ranges between forty and fifty-five. Handkerchiefs and wrappers of wool or other fabric, are an inadequate substitute; since they act by confining the expired air, and thus re-introduce air unfit for respiration.

Of the causes illustrated in this lecture as inducing or aggravating consumption, some are under our own control. That source of many plagues, contaminated air, is not essential to our apartments and workshops. Open fire-places, with Arnott's ventilators of sufficient dimensions, or even a zinc pipe communicating with the chimney, would to a great degree correct the evil; and some hundreds of lives might probably, by a few such simple precautions, be annually saved in this metropolis.

In addition to the benefit of free exercise in the open air, much good would, I believe, accrue from attention to the power with which the will is endowed over the respiratory muscles. I cannot but think that some of the evils incident to intense study might be obviated, by occasionally pausing to practise breathing.

The unfavourable influences noticed in this lecture may be regarded as producing their effect, first, by deteriorating the blood; secondly, by occasioning congestion in the lungs. Mental depression and bad air are not without analogy in their action; for both, in all probability, retard the respiratory act.

Among the mental causes of disordered health, few are more operative than that continual source of disquietude, and physical exhaustion,—ambition beyond the extent of power. It is difficult to estimate the amount of evil which might be prevented, if individuals

could attain a correct estimate of their powers, and avoid attaching themselves to offices for which they are not adapted. Unhappily, the selection of occupations among the lower orders usually depends on circumstances quite irrespective of special adaptation; and, in the upper classes, motives of gain too often overrule considerations of health, or moral fitness. It is the duty and privilege of the medical practitioner, to take every opportunity of impressing truths so important to the health of the community; to exert his influence against that inordinate estimate of lucre, which leads so many to forget that health is property of the highest value; and to demonstrate, as opportunity occurs, that health would be essentially promoted, if education were so conducted as to train the mind for tranquil superiority to passing cares, and to qualify for the exhilarating occupations of a useful life. I will not apologize for having introduced on such an occasion as the present, what may be considered as one of the moral aspects of professional science; for you will agree with me that a medical man is never more in his vocation than when fulfilling the offices, and impressing the lessons of an enlightened philanthropy.

LECTURE XIII.

Distressing incidental symptoms of phthisis—Night perspirations—Cough—Results of consumption—Apparent cure—Contraction of cavities—Unfavourable cases—Acute phthisis—Progress of decay—Phosphatic concretions in the choroid plexuses—Mental condition of the dying—Conclusion.

In proceeding, gentlemen, to conclude this course for the present session, it occurs to me that among the more distressing incidental symptoms of consumption, are some which have been only cursorily noticed, and on which it might have been profitable to dwell. There is only time, to-day, to revert to one or two of these symptoms. One of these is night perspirations. You have had numerous opportunities of observing how often, without any treatment specially directed to control the perspirations, they have ceased under the employment of means calculated to improve the general constitutional condition. Such a result, however, is by no means constant. You have seen that various medicines have been administered, with a view to diminish this cause of distress. Sometimes it has been relieved by small doses of opium, as contained in compound kino powder, or Dover's powder, sometimes by mild aperients; but the remedies usually thought appropriate are acids, such as the sulphuric and the gallic. The

diluted acetic acid, given in drachm doses with cascarilla or any other bitter infusion, three times a day, has appeared to me to be the most effectual of this class of remedies; and the object is promoted by administering in addition, every night at bed-time, five grains of gallic acid, and an eighth of a grain of hydrochlorate of morphia, made into a pill with mucilage. Sponging the body occasionally with a tannic acid lotion is a useful auxiliary in the treatment. Of late I have given, with most satisfactory results, four grains of oxide of zinc, with four of extract of henbane. No remedy which I have as yet employed has exercised so uniformly favourable an effect in moderating the night perspirations. I have occasionally substituted the sulphate of zinc in doses of two grains, with advantage; but, generally speaking, the sulphate proves less efficient. The preparations of zinc occasionally fail to accomplish the object, and in some instances, after succeeding for a time, lose their power; but this is unfortunately still more common with other medicines used for the purpose; and I am particularly anxious to direct your attention to the valuable properties of zinc, because the preparations of this metal have been disparaged by some writers of authority. Ratier* observes that zinc is no longer much esteemed in therapeutics; and the late Dr. Pereira asserted that the sulphate, although checking pulmonary and urethral catarrh, had no power of checking cutaneous exhalation. As respects the oxide, I am not aware that the existence of such a property has been even surmised by the profession.

* Dictionnaire de Médecine et de Chirurgie, 1836.

An instance is recorded by Dr. Busse of Berlin,* of a gentleman who, after taking a scruple of the oxide daily for some months without success for the treatment of epilepsy, became cold and shrivelled, and his skin like parchment, but no practical deduction appears to have been made from this observation; and I am happy to refer to the right source a practical suggestion for which the public are much indebted. The remedy was first used at this hospital at the suggestion of Dr. Robert Dickson, whose acuteness of observation led him to detect this property of the oxide in some patients, to whom he had administered it as a general tonic. I hope Dr. Dickson will pursue his investigations, and be able to discover the cause of the peculiarity in this medicine, which seems to render its administration singularly efficient in checking the perspirations connected with the hectic of phthisis.

You may have been struck with the variety of medicines given with a view to moderate cough; especially as I have not said much on the principles which have guided their selection. Perhaps there is no symptom of which consumptive patients complain so urgently as of cough; and there is scarcely any which so often baffles our efforts for its relief. This subject is far too wide to be treated systematically in a single lecture; for the severity of the cough is doubtless modified by a variety of circumstances, such as the amount of bronchial irritation, the quantity and kind of expectoration, the constitutional irritability, and the condition of the skin. If any degree of bronchial inflammation be present, small doses of antimony are indicated; and in

* Wochenschrift für die Gesammte Heilkunde, 1837, No. 19.

some instances the application of a few leeches over the windpipe affords much relief. In allaying cough in irritable subjects, much advantage is often derived from the administration of four minim doses of tincture of aconite in spermaceti mixture; and counter-irritation may often be resorted to with advantage. When the urgency of the cough has more relation to the tenacious character of the expectoration than to nervous irritability, lemon-juice has sometimes seemed to me to be a useful remedy. In other similar cases the solution of potash does good, especially in combination with squill; although this latter remedy, in cases complicated with any degree of bronchial inflammation, would probably aggravate the symptoms.

Anodynes, such as hemlock, henbane, Indian hemp, &c., are occasionally useful, and there can be no doubt of the value of hydrocyanic acid. A draught, containing an eighth of a grain of cyanide of potassium, an ounce of aniseed-water, and some syrup of lemons, is perhaps more trustworthy than prussic acid in the usual form of administration. In a great number of instances, however, we are obliged to place our chief reliance on opium, or on some of the salts of morphia. An agreeable linctus may be composed of an ounce of conserve of roses, half an ounce of lemon-juice, and half an ounce of syrup of poppies; or a drachm of tincture of opium, and a drachm of diluted sulphuric acid, may be mixed with an ounce and a half of treacle or honey, and a teaspoonful given occasionally.

You have had an opportunity of observing the relief often derived from inhalation. An infusion of an ounce and a half of the strobiles of hop in a pint of hot water

sometimes proves very soothing. Some of our patients have derived still greater advantage from inhaling two grains of extract of opium, by means of the apparatus introduced by Dr. Snow. On the whole, however, no remedy has acted so promptly and satisfactorily in allaying cough, as the inhalation of fifteen or twenty minims of chloroform.

Were there time it might be profitable to review some of the subjects which in these lectures have engaged our attention; such as the general aspect and movements of the chest, the indications furnished by auscultation of consumption, whether threatened, or commencing, or proceeding; modifications of the expectoration, and of the urine; altered constitutional condition, as evinced by disturbance of the laws which regulate the pulse; perhaps also, manifestations of change in the circulating fluid and bodily structure, as indicated by the gums. The plan adopted has necessarily partaken of a somewhat discursive character; but, with all the imperfections of its execution, I have the satisfaction of hoping that I have at least indicated some instructive lines of inquiry, and assisted you in cultivating the habit of observing and appreciating facts.

You have watched with interest the occasionally successful results of treatment on a disease, once considered almost beyond the reach of remedial measures. One or two further examples of this kind may here be introduced.

G. A., the patient now before you, came into the hospital some months since, with extensive gurgling, and cavernous breathing, in the subclavicular and suprascapular regions on the left side. There are still

evidences of cavity in that situation, but it is dry, and must have materially contracted; for you see how greatly the left side of the chest is flattened, and the apex of the heart, quite irrespectively of any disease or other disturbance of that organ, is found, in consequence of the altered relations of the walls of the chest, beating close to the left nipple.

You recollect evidences of changes fully as favourable in S. G., E. M., M. A. B., and others; and may naturally inquire what changes in the pulmonary structure may be regarded as having occurred in such instances.

In one of these drawings by Dr. Carswell, you see the delineation of a cavity, which, it is evident from the puckered and depressed appearance of the lung at its surface, must once have been of considerable size, but which has been reduced to comparatively small dimensions; and a smooth, pale membrane is well represented as constituting its walls. Such cavities may ultimately cicatrize, or, having contracted to a very great degree, may have their original seat marked by the presence of a dry material looking like putty, probably the relic of tubercular deposit deprived by absorption of its serous and albuminous material, and having its earthy salts condensed.

I am indebted to the courtesy of my colleague, Dr. Quain, for the opportunity of showing you some lungs, which illustrate the extent to which the process of contraction of a cavity may proceed. Nearly the whole of the upper lobe of this left lung has, you see, been destroyed by tubercular disease. It is now little else than a cavity, about the size of a large walnut, containing half a drachm of thin whey-like fluid, inter-

mixed with particles of pale coagula; its walls, formed by condensed pulmonary tissue, puckered and contracted, varying in thickness from a line to a quarter of an inch. This tissue contains small bronchi and air-cells, visible under the microscope, and separated from the contents of the cavity by a membrane of firm filamentous tissue, with granular cells, having much the appearance of mucous membrane. The cavity communicates with the left bronchus by an orifice as large as a goose-quill. This lung on immersion displaces only nine ounces of water; while the right lung displaces twenty-three ounces. Its upper part presents puckerings corresponding to short fibrous bands, intersecting softish, pale-yellow, tubercular spots. This lung contains several portions of condensed tissue, with yellow, firm tubercle, and some small calcareous particles, and in the centre of the upper lobe, an encysted mass of soft tubercle, of the size of a hazel-nut, consisting chiefly of fatty granules, and cells containing similar particles. The other organs were healthy.

You have here a specimen of lungs full of the results of old tubercular affection, but free from any evidence of recent tubercular deposit; and the cavity at the apex of the left lung has obviously been for a considerable time in process of contraction. As Dr. Quain observes, this case presents an example of the great extent to which the ravages of consumption may extend, and yet be stayed. The poor girl from whom these lungs were removed became an out-patient of the hospital in May, 1848, when thirteen years of age, presenting decided dulness and bronchial respiration at the apex of the left side; and feeble inspiration with pro-

longed expiratory murmur on the right side. In August, crepitation was heard at the left apex; in September, she expectorated much blood and pus; in October there was distinct pectoriloquy. She was treated chiefly with cod-liver oil, and solution of potash, and counter-irritation was occasionally employed. In July, 1849, she looked well, and coughed only in the morning; in August flattening was recorded, as proceeding in the upper part of the left chest. In February, 1850, her appetite, which had failed, was benefited by soda and gentian; and the cod-liver oil was continued, but in increased doses. During the winter of 1850-51, her appearance was healthy, her cough nearly gone, and her weight seven pounds above what it was two years previously. In the beginning of the present month she was attacked with influenza; which, rather remarkably, exhibited the gastric, not the pulmonary complication, and she sank in four days from bilious vomiting and diarrhœa. If the unfortunate complication of severe influenza had not occurred, it is not unreasonable to imagine that this patient might have lived for years, an example of what, in conventional language, may be termed a cure of consumption in the third stage. For further particulars of this case I may refer you to Dr. Quain's account, in the Transactions of the Pathological Society for 1850–51.

We must still acknowledge the fact, that in a majority of instances favourable results are not obtained; and that, in those cases especially in which tubercular material is extensively infiltrated rather than isolated or agglomerated, moist crepitation (clicking) followed by cavernulous rhonchus, soon indicates that

the lungs are becoming riddled with cavities. Hectic is established; weakness and emaciation increase; the legs become œdematous; the mouth is aphthous; diarrhœa perhaps becomes uncontrollable; and the patient, gradually worn out, sinks into the grave. Sometimes, indeed, these changes proceed with such appalling rapidity, as to exhibit that variety of the disease denominated acute phthisis.

H. H., a patient whom you may remember in Richmond ward, came into the hospital a few weeks since, looking extremely ill, and with a weak rapid pulse; but we could not detect any physical signs of pulmonary disease, and several medical friends who did me the favour to assist in the examination came to the same negative conclusion. In the first week of his stay, however, the respiration became obviously and universally harsh; in the second week I found the expiratory murmur prolonged, the tongue had become glazed and dry, and he had a typhoid aspect. In the third week, dull percussion and dry crepitation (crackling,) soon succeeded by the coarse and humid variety, occurred. At the commencement of the fourth week gurgling and pectoriloquy were detected; and two or three days after this evidence of cavity was noticed, he died.

Examples of this acute variety of consumption are not however very common. The more usual course is that of which you find a good example in the case of J. L., whose cough began about two years since, and the progress of whose symptoms I need not describe in detail, because they correspond so closely with what you find delineated in systematic writings on the sub-

ject of the disease. In this patient, however, towards the closing period, some peculiar circumstances were observed. You remember my having called your attention to his dirty-grayish expectoration, having subsequently a pinkish halo, as one of the indications of an approaching fatal issue. His pulse, which had long been quick, and rather weak, fell to 72, and became comparatively full. Two days before death his pupils were slightly dilated, but responded to the stimulus of light. His hands were cold. His appearance was something like that of a person affected with delirium tremens; he sometimes picked the bed-clothes, at other times held them out as if to examine them; then pointed as though at some object on which his eye seemed fixed, yet without distinct consciousness. The smell, often characteristic of the dying state, was present. In two days he died; not as is usual with the consumptive, from asthenia, the powers being slowly exhausted, and the heart failing from a deficiency of its natural stimulus, but rather from suffocation, in consequence of the bronchial tubes being charged with excessive secretion.

The peculiarities of this patient's symptoms are worthy of your consideration, in relation to the post-mortem appearances. The right lung at its upper part was completely excavated; the left contained a large well-defined cavity in its upper lobe, corresponding with the gurgling and metallic pectoriloquy to which I called your attention during life. The spleen weighed ten ounces and a half, a circumstance probably having reference to the ague from which he had suffered. The heart was considerably thickened, and weighed sixteen ounces, but was free from valvular disease;

there was some serous effusion in the arachnoid cavity, and the vessels of the brain were in a state of congestion. The point of special interest, however, was the choroid plexus; the margin of which on each side was rounded, thickened, and hardened, in consequence of the presence of particles of deposit (which were gritty to the scalpel,) enclosed in a capsule of loose filamentous tissue. These bodies, some of which are now presented to you, are for the most part spherical, a few cylindrical, and some are studded with minute projections. When pressed they crack, and assume, as you perceive, a wheel-like appearance. They vary in diameter from the two thousandth to the two hundred and fiftieth part of an inch, and are composed of phosphate of lime united with organic structure. The appearance of these bodies under the microscope is well represented in the accompanying drawing.

Dr. Quain has described these corpuscles with his accustomed accuracy, in a communication to the Pathological Society;* and has called my attention to an account of similar bodies by Dr. Hughes Bennett in a tumour attached to the tentorium cerebelli, and also exhibited to the same society.† Similar deposits have been noticed by medical observers as occurring in various parts of the body: by Gluge‡ in an ovarian

* Vol. v. p. 45.

† Vol. i. p. 44.

‡ Atlas of Pathological Anatomy, Plate II.

cyst; by Lebert* and Wagner, in the eye of a horse.† Their presence in the choroid plexus has been repeatedly observed by Valentin, and others; but particularly by Bergmann, who considers that they are peculiarly apt to abound in the brains of lunatics.

There certainly was a singularity in the aspect and manner of our patient, leading to the expectation of some peculiarity of cerebral condition. The question may be entertained, whether this undue deposit of phosphates in the brain had any relation to the disturbed intellectual condition; and I am disposed to suggest this inquiry in reference to some interesting observations by Dr. Bence Jones,‡ on the great excess of phosphates in the urine of patients affected with functional disturbance of the brain, accompanied with delirium.

It is common when death is approaching, especially when induced by a disease which, like phthisis, gradually exhausts the powers, and impoverishes the blood, for the pulse to increase in frequency, whilst at the same time it often becomes irregular and fluttering. J. L. was an exception to this rule, his pulse some days before death having subsided from above 100 to 72, without losing strength or regularity. The explanation of this fact may probably be derived from the state of the heart. In cases of hypertrophy of this organ, the pulse often remains slow and firm almost to the last; and the changes in this patient's nervous condition, by suspending the manifestations of irritability in the vas-

* Physiologie Pathologique, Plate XI., Fig. 10.

† Handwörterbuch der Physiologie, p. 639.

‡ Philosophical Transactions, 1846, Part IV.

cular system, left the circulation to the influence of the thickened heart.

It is a melancholy office, in the last stage of phthisis, to watch the relentless progress of weakness and decay; still we may often palliate suffering, and by suitable ministrations contribute to the comfort of the patients. To mental consolations they are peculiarly accessible; for in such patients the mind, in a majority of instances, remains clear almost to the closing scene. One of my patients, shortly before her death, asked if she might have a basin of hot water to warm her hands. Another, C. W. who lately died in Rose ward, seemed for a moment a little bewildered, exclaimed, "Where am I?" and then expired.

I must defer till another opportunity, if such should occur, more extended remarks on the phenomena and management of the last days of life. There is, however, one suggestion which, in conclusion, I would briefly notice. It has been proposed, particularly by an American writer, with a view to promote euthanasia, to administer chloroform by inhalation when death is approaching. It can scarcely be necessary to say anything to dissuade you from such a practice. At the solemn period of transition to another state of existence, it cannot be justifiable thus wilfully to suspend the exercise of the intellectual functions. Such a measure might indeed be rebuked by the example of the Empress Maria Theresa who, when urged in her last moments to destroy by opium the consciousness of pain, replied, "I would meet my Maker awake;" or I might refer you to a venerable lady, more than ninety years of age, whom I once attended, and who, in answer to

my arguments for the desirableness of endeavouring to sustain the circulation with brandy, made answer, "Let me go home sober;" and thus gracefully passed off the stage of life. Such suggestions, however, will rarely be urged in cases of consumption, the sinking of the powers in this disease being so commonly painless and gradual, sometimes, indeed, not only calm but cheerful. I remember a young woman, whose physical powers were thus failing, saying, "Mother, I am going to sleep, and if I do not wake I shall be in heaven." Her expectation we may trust was realized, and thus she glided into rest, not fearing death, because not doubting of heaven: and furnishing an instance in which you would not have been surprised to see depicted on the countenance of the departed more than what the poet fancied, when he wrote of "the rapture of repose." Am I passing beyond becoming bounds in suggesting the reflection that, while witnessing such transitions from languor and decay into an undying life, we may ourselves realize the truth that death is not the end of existence;—that it is something grander than human skill defeated;—that, when art can do no more, and friends "weep at the vestibule as the spirit passes out of doors," we may win glimpses of brighter scenes, where the cares and passions of this lower life shall cease to engross, and the germs of opening science shall expand into the fulness of infinite Truth.

EXPLANATION OF PLATES.

PLATE I.

FIG. 1.—Granular expectoration (magnified 600 diameters,) referred to in page 74, as indicating tubercular deposit.

a. Scale of tesselated epithelium, probably from the mouth. A few oil globules are also apparent.

FIG. 2 exhibits the changes described on pages 164, 165, as often occurring rapidly in the blood discs of consumptive individuals.

a. The blood discs as first observed.

b, *c*, *d*. The discs of strawberry-like shape, crenate, stellate, and corrugated.

e. Discs forming a rouleaux; also three large colourless corpuscles, which frequently abound in the blood of the phthisical.

PLATE II.

This plate represents the curved, coloured margin of the gums, strongly indicative of the consumptive diathesis. See page 171, Lecture X.

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