

**On chronic bronchitis : especially as connected with gout, emphysema, and diseases of the heart being clinical lectures delivered at the Middlesex Hospital / by E. Headlam Greenhow.**

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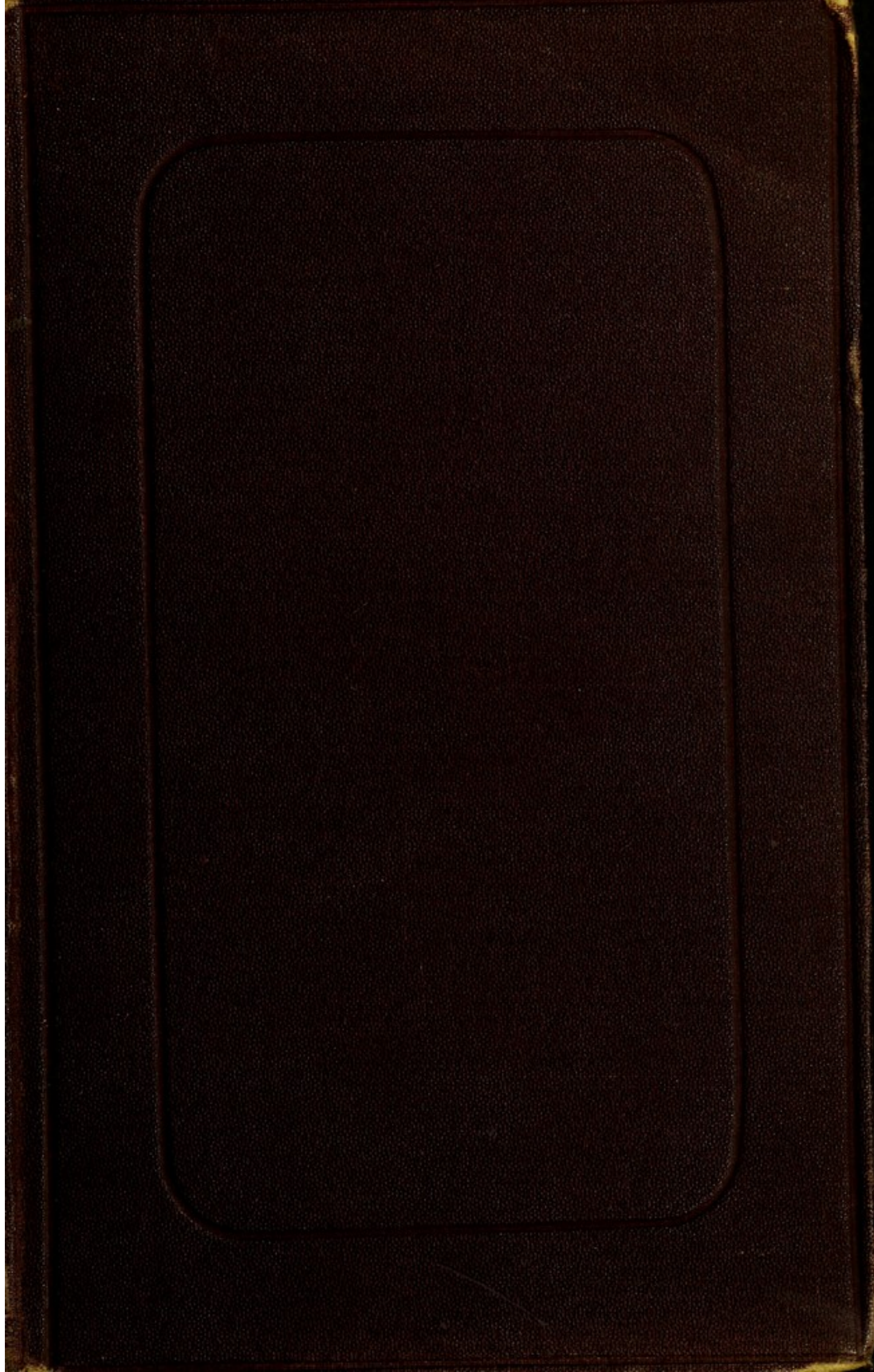
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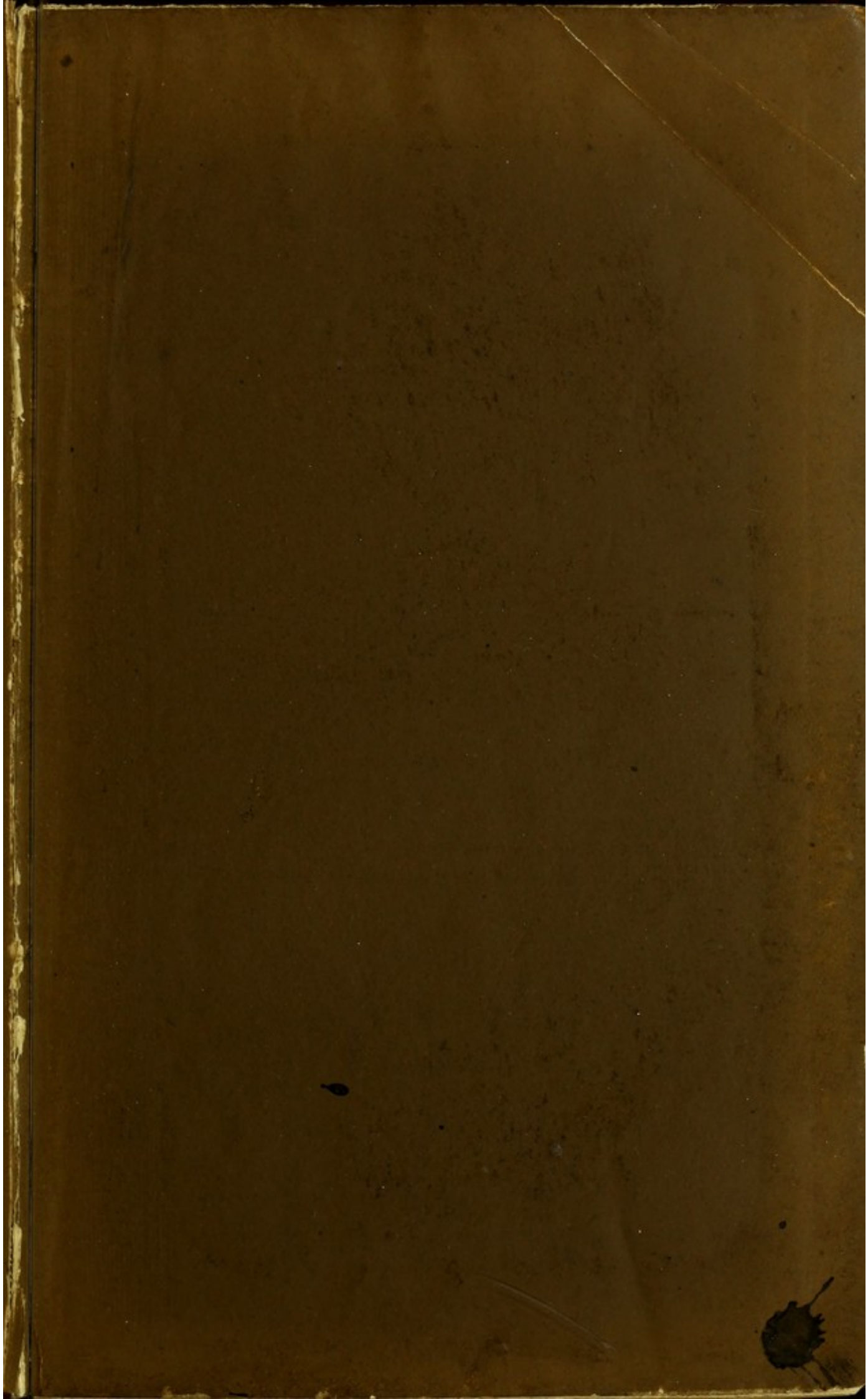
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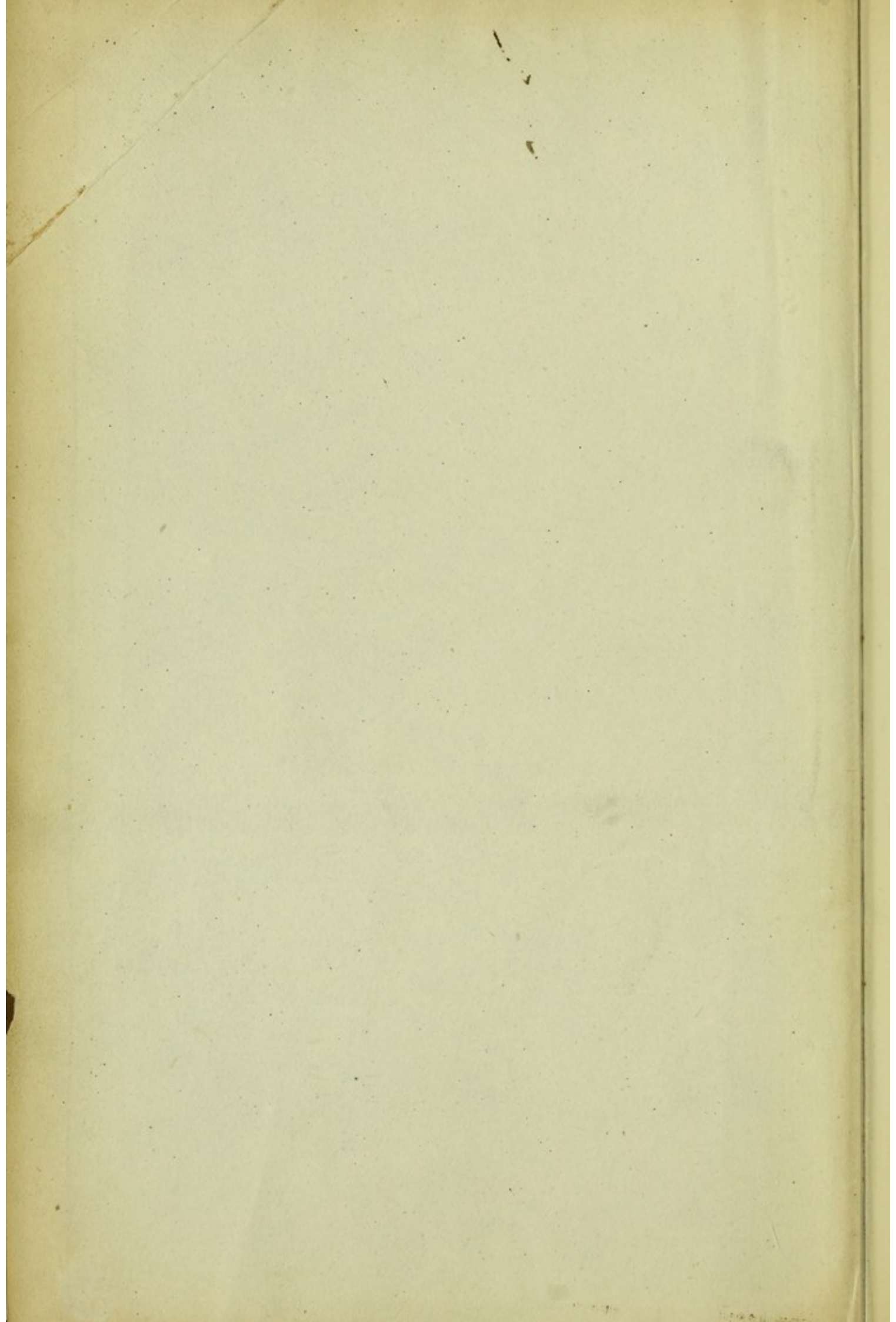


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From the author

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ON

# CHRONIC BRONCHITIS

ESPECIALLY AS CONNECTED WITH

GOUT, EMPHYSEMA,  
AND DISEASES OF THE HEART.

*BEING CLINICAL LECTURES DELIVERED AT THE MIDDLESEX HOSPITAL.*

BY

E. HEADLAM GREENHOW, M.D. F.R.S.

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CONSULTING PHYSICIAN TO THE WESTERN GENERAL DISPENSARY.

LONDON:

LONGMANS, GREEN, AND CO.

1869.



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CHRONIC BRONCHITIS

AND ITS TREATMENT

BY

H. BRADY, M.D.

OF THE UNIVERSITY OF MICHIGAN

LONDON:

LONGMANS, GREEN, AND CO.

1888.

TO  
JOHN SIMON, ESQ., F.R.S., D.C.L.

MEDICAL OFFICER OF HER MAJESTY'S MOST HONORABLE PRIVY COUNCIL,  
SURGEON TO ST. THOMAS'S HOSPITAL,  
ETC. ETC. ETC.

LESS IN ADMIRATION OF  
THE EMINENT POWERS AND LOFTY AIMS  
WHICH HAVE COMMANDED FOR HIM A DISTINGUISHED PLACE  
IN PUBLIC ESTIMATION  
THAN IN GRATITUDE FOR  
THE WARM FRIENDSHIP AND UNVARYING KINDNESS  
OF MANY YEARS

*This Work is Inscribed*

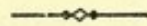
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## PREFACE.



THE LECTURES comprised in this volume have been delivered to the students of the Middlesex Hospital, from time to time, during the last two years. Some of them were published in *The Lancet* shortly after their delivery, and I have been induced to republish these, by the numerous suggestions to that effect which I have received, not only from medical friends, but also from professional brethren, at home and abroad, with whom I am not personally acquainted. I have added to the lectures already published all the others that I have had the opportunity of delivering, on branches of the same subject, and have carefully revised the whole.

The fact that considerable intervals of time have, in some instances, unavoidably elapsed between the delivery of one lecture and that of its successor, will sufficiently account for some apparent deficiency of

connection between them; as well as for occasional redundancies of explanation, which cannot now be removed without injury to the argument of the individual lectures.

I need scarcely say, that I do not profess, in this little work, to have entered exhaustively into the subject of Chronic Bronchitis, and the numerous diseases with which it is associated in the relation either of cause or of consequence. I trust, however, that I have succeeded in my object of demonstrating more clearly than has heretofore been done, the intimate connections between Chronic Bronchitis and certain constitutional and local conditions.

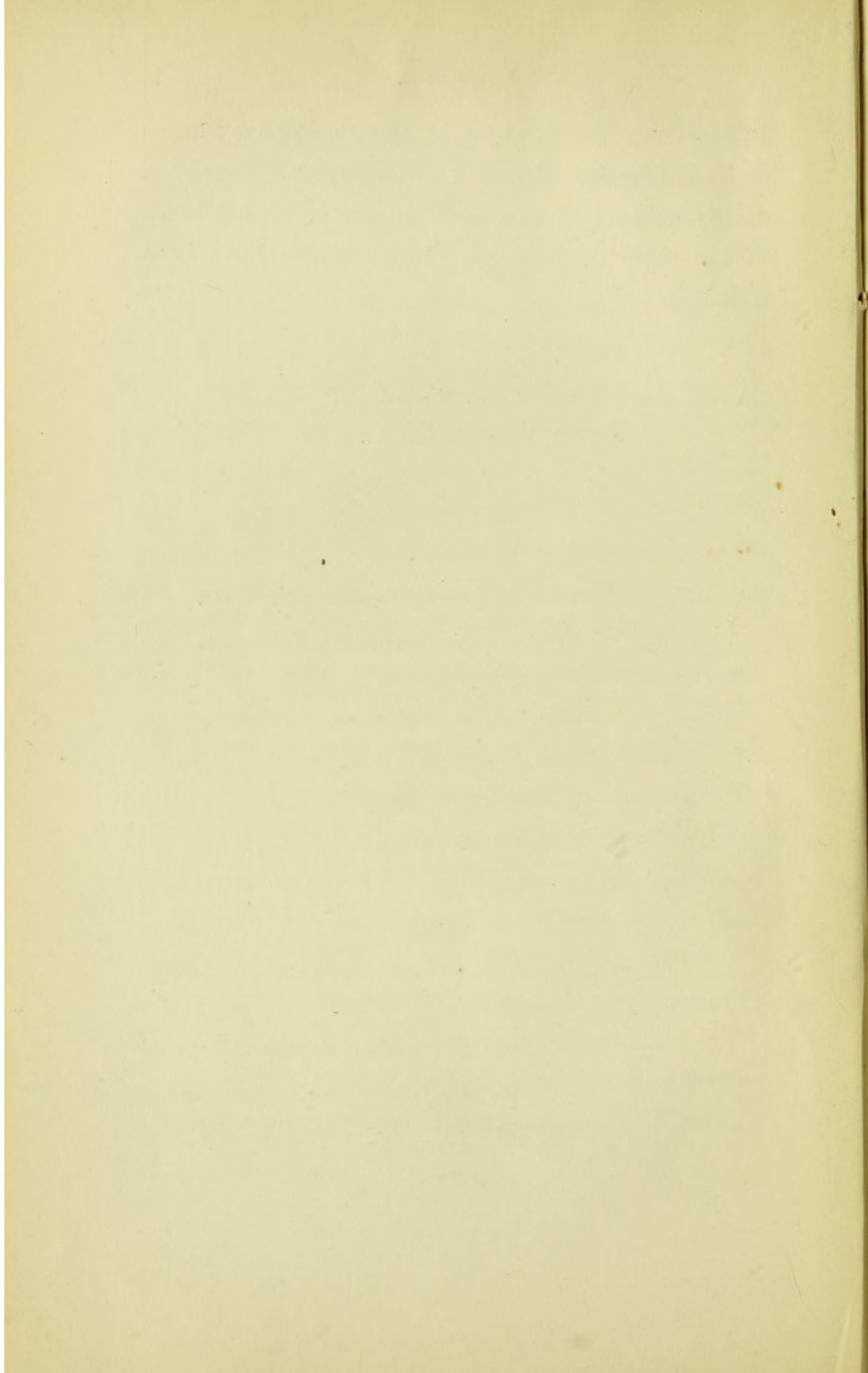
I cannot refrain from expressing, in conclusion, my deep sense of obligation to my friend Dr. A. P. Stewart, late Senior Physician to the Middlesex Hospital, and also to my friend and present colleague Dr. Henry Thompson, for the kindness and liberality with which they have at all times, during many years, permitted me the free use of cases under their care; and, still more, for their having repeatedly transferred cases of their own to my care, when they were of a nature to assist my investigations.

My best acknowledgments are likewise due to several of my late clinical clerks, and more especially

to Dr. John Murray, and to Messrs. Walter Maine, J. H. Casson and Horace Chaldecott, for the zeal and ability with which they assisted me in taking notes of the cases upon which these lectures have been founded.

UPPER BERKELEY STREET, PORTMAN SQUARE:

*December 1868.*



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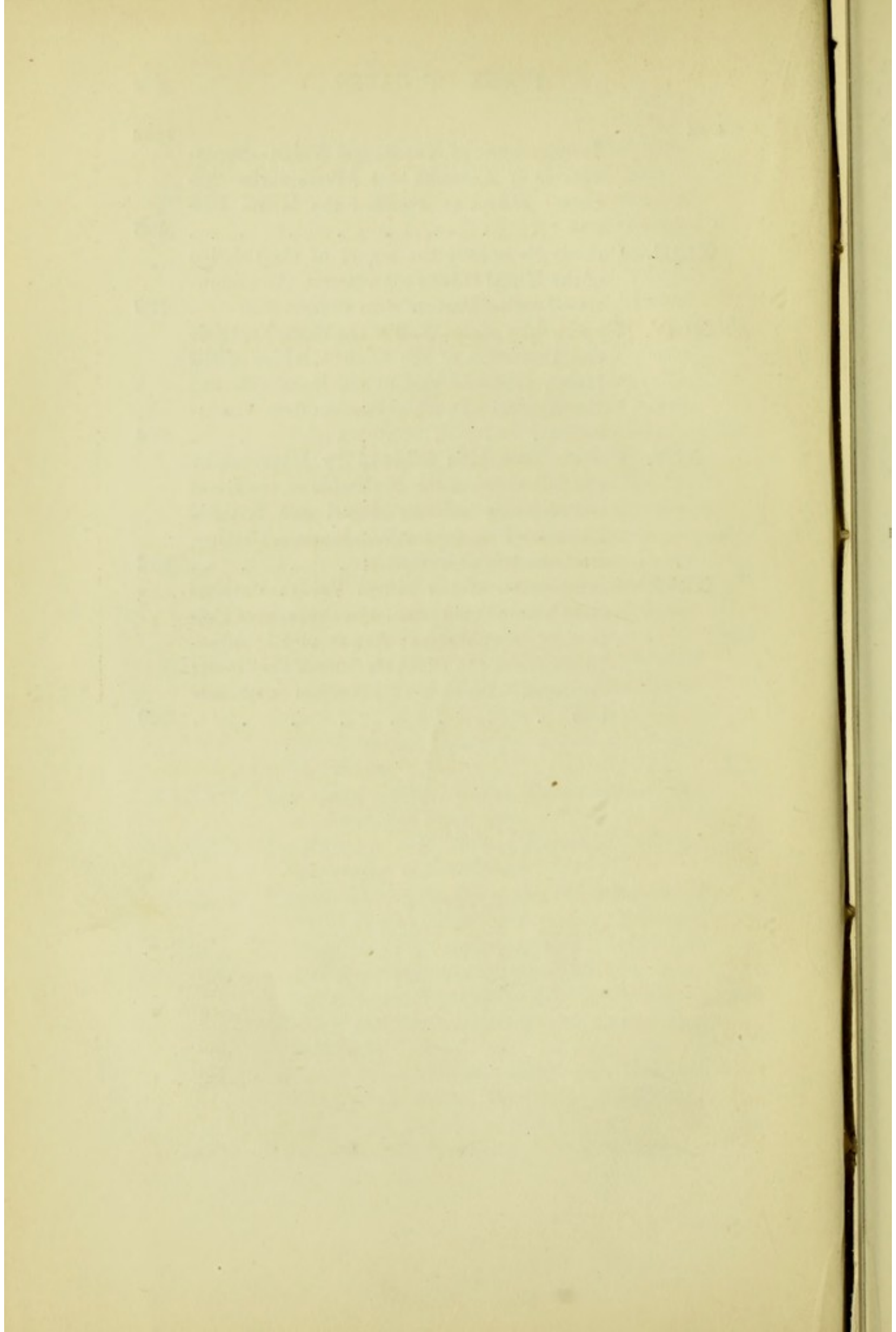
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CLINICAL LECTURES  
ON  
CHRONIC BRONCHITIS.

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LECTURE I.

*CHRONIC BRONCHITIS.*

PRELIMINARY OBSERVATIONS—ETIOLOGY OF BRONCHITIS—RELATIONS WITH OTHER DISEASES—ANALYSIS OF CASES: I. DURATION OF DISEASE; II. INFLUENCE OF SEASON; III. PREVIOUS HISTORY OF PATIENTS; IV. HEREDITARY TENDENCIES; V. EXISTING COMPLICATIONS—RELATIONS WITH GOUT; PSORIASIS AND ECZEMA; RHEUMATIC FEVER; EMPHYSEMA; PHTHISIS—BRONCHITIS FROM EXPOSURE—BRONCHITIS FROM MECHANICAL IRRITATION.

GENTLEMEN,—I purpose to bring under your notice to-day an exceedingly common, but, in my opinion, on that very account, a most important disease. You have lately seen in the wards of the hospital, but still more in the physician's out-patient room, a great many cases of chronic bronchitis, a complaint which is especially prevalent at this season of the year. Some diseases derive their chief interest from the rarity of their occurrence, affording us only few and distant opportunities of observation; but the complaint I have chosen as the subject of these lectures is important, on the contrary, from its being of such frequent occurrence that you will all of you be

sure to meet with it as soon as you engage in practice. Some diseases, again, receive a large share of attention because the obscurity of their nature, causes, and effects, renders them peculiarly attractive subjects for scientific investigation; but the disease I now propose for your consideration is, for exactly opposite reasons, perhaps a more profitable subject of study for those whose first endeavour should be to obtain a thorough acquaintance with such diseases as they are most likely to be called upon to treat.

Chronic bronchitis is, as I have said, a very prevalent complaint. Nor is it only of very frequent occurrence in different persons; for one of its chief characteristics, and perhaps the most formidable one, is its great tendency to recur again and again in the same person, and often at the same season; the attacks increasing in severity and duration from year to year, until at length the sufferer is scarcely ever entirely free from their effects, and becomes gradually disabled from all active employment.

Moreover, in estimating the importance of a thorough study of this disease, we must not overlook the fact of its peculiarly wide and intimate relations with other diseases, both of the lungs and of other organs, and with several of the commonest forms of dyscrasia to which the human frame is liable.

Bronchitis, as you are all well aware, is essentially an inflammatory affection of the bronchial mucous membrane, attended by more or less of flux from the inflamed surface. As regards its usual symptoms

and physical signs, I shall not now enter into any separate detailed exposition. You are already in some measure familiar with them, and it will be most convenient to incorporate any explanations, which I may deem it desirable to make on these points, with other practical comments on the cases which I shall cite in illustration of my subject.

But although bronchitis is always manifested by similar symptoms, and is therefore pathologically known by one name, it is by no means of uniform character in different persons, but varies much in extent, intensity, and duration. Thus it may be limited to the larger branches of the bronchial tree, or it may extend to the capillary tubes. It may be a more or less severe acute attack, running a comparatively rapid course, and ending in perfect recovery; or it may assume a sub-acute or a chronic form and its duration be indefinitely protracted. In its severer forms it is a very fatal disease, especially to the young, the delicate, and the aged. In its milder forms it is attended by no immediate danger to life; but as a bronchial membrane which has once been inflamed is very prone to a recurrence of inflammation from comparatively slight causes, even a mild attack of bronchitis may, especially in persons whose health is otherwise not perfect, become the starting-point of a chronic bronchial affection, and thus lay the foundation for life-long delicacy, or for various secondary ailments.

In the next place, although the general symptoms

of bronchitis are always similar, inasmuch as it is always the same structure which is the seat of irritation, this irritation may be produced by very various causes: some proceeding from without, and others from within the organism; some accidental, and others constitutional. One cause, which I have on former occasions shown to produce an immense amount of bronchial disease in certain manufacturing districts of this country, is the inhalation of mechanical irritants, such as fine grit, dust, or fluff, by the operatives employed in various industrial occupations. Vicissitudes of weather and exposure to cold or damp are, however, generally regarded as the only exciting causes of bronchitis. Sometimes such exposure is, in fact, the only cause, as when an attack of bronchitis results from remaining for some time wet-shod, getting chilled or wet through on a journey, or else from passing, without proper precautions, from the hot and dry air of a crowded church or theatre to the cold or damp atmosphere out of doors. And, again, it is notorious that vicissitudes of weather, such as the setting in of a biting east wind, or of humid weather after a long drought, often serve as the exciting causes of bronchitis. Nevertheless, there can be no doubt that, in the majority of instances, such causes only excite the disease when a strong predisposition to it already exists; either from some constitutional derangement of health, or else from delicacy of the bronchial membrane consequent on previous attacks of bronchitis, or on long-standing

local irritation arising from the inhalation of dust or of over-dried air. I am, moreover, well assured from long and careful observation, that chronic bronchitis is sometimes the direct consequence of some constitutional vice, apart from exposure to any external exciting cause. In confirmation of this opinion, I may remind you that bronchitis, although certainly far more prevalent in the colder season of the year, is by no means peculiar to it; and in some cases, even, has a definite tendency to recur periodically in summer, instead of in winter, and usually, on such periodical recurrence, to be associated with some well-marked constitutional disorder.

I have already alluded to the intimate relations between chronic bronchitis and various other ailments, local or constitutional. These relations may be those either of cause or of consequence: as when, on the one hand, bronchitis produces some secondary lesion either of the lungs or heart, or some more remote sequence, such as disease of the liver or kidneys; or as when, on the other hand, bronchitis is itself the secondary result of some constitutional vice, such as gout or syphilis, or of some local affection, such as cardiac or renal disease.

Bronchitis may thus be either a primary or a secondary affection. Primary, when it is the mere result of exposure to cold or wet, or when the irritation excited by the inhalation of dust develops the disease. Secondary, when the bronchial affection arises out of some constitutional vice, or some other

previously existing ailment; such as any of those I have just named. Again, bronchitis may be associated as a complication with other diseases, such as measles or whooping-cough, or with other pulmonary affections, such as phthisis or pneumonia.

The subject, indeed, is such a wide one that I do not purpose, neither would it be possible for me, to enter into its consideration exhaustively to-day, but I have made these general preliminary observations in the hope of impressing on you the great practical importance of studying a disease, the variety of causes, complications, and consequences of which must obviously render the prognosis and treatment equally various in different cases.

In order to bring the several relations of bronchitis to which I have adverted more plainly before you, I have made a careful analysis of all the cases of chronic bronchitis which have come under my care during the last three months, chiefly in the out-patient department of the hospital; and, before proceeding to read you the history of individual cases in illustration of those relations, I shall give you the results of my analysis.

Bronchitis being, however, often a mere result of the degenerative tissue-changes incident to advanced life, I have deemed it best to exclude from my analysis all those cases which could properly be classed under the head of senile bronchitis. After this deduction there remain ninety-six cases, fifty-five of

which are those of males, and forty-one those of females; three-fourths of the number having been between the ages of twenty and fifty years.\*

These cases were taken as nearly as possible upon a uniform plan, and the points in their history more particularly noted were :

- I. The duration of the disease.
- II. The influence of season on its accessions.
- III. The previous history of the patients as regarded other diseases or exciting causes.
- IV. The existence of a hereditary tendency to any form of dyscrasia.
- V. The actually existing complications.

I need scarcely say that, in many cases, reliable information on one or more of these points was not to be obtained. But, notwithstanding such partial failures, I have been enabled to collect sufficient information to serve my present purpose of showing you how largely the origin of chronic bronchitis may be referred to some constitutional condition; and also how frequently the first attack of this disease, and therewith the disposition to subsequent attacks, may be traced back to some preceding illness.

On analysing the cases with reference to the several points which I had kept in view whilst taking them, I found, in the first place, as regards the duration of

\* Since the delivery of this lecture I have had ample opportunities for adding largely to the number of cases comprised in my analysis; but, as my subsequent experience all tends to confirm the results given above, I have not thought it advisable to disturb the text by altering the original numbers.



the disease, that a very large proportion of the patients had already suffered from several, and some from many, attacks of bronchitis previous to the one for which they came under my care during the present winter. In twelve cases only was the existing attack the first, or even the second, from which the patients had suffered. In forty-nine of the remaining cases, the patients had been subject to attacks of chronic bronchitis for periods varying from five to twenty years. In some instances the disease had commenced in childhood, and had recurred annually up to the time of the patient's coming under observation. In a few cases there was never entire freedom from the disease; in a few others, again, it was said not always to recur annually, but occasionally to miss a year. In some of these latter cases, however, it seems probable that the attacks were milder, rather than altogether absent, in certain years; for, on close enquiry, it appeared that the patients did not regard as an accession of their complaint anything short of an attack sufficiently severe to disable them from following their usual occupations.

As regards the second point; namely, the influence of season on the development of the periodical accessions of the disease, it was found that winter was exclusively the season of attack or exacerbation in fifty cases; that in a few cases the attacks came on only in spring and autumn; in a few others only in summer; and that in about twenty cases the patients could scarcely be regarded as being ever free from their

ailment, though it was liable to be aggravated by every undue exposure and by every change of season.

We have now arrived at the points which relate to the previous history of the patients, and to the existence of a hereditary tendency to any form of dyscrasia; and these include branches of the investigation not only essential towards elucidating the etiology of the disease, but also practically important, in a degree it is scarcely possible to overrate, with reference to the treatment of every individual case. How, indeed, shall we be able to prescribe for our bronchitic patients to the best advantage, unless we can not only ascertain the existence of bronchial irritation, but can also determine whether this irritation be primary or secondary; whether it be the result of an external cause or of an internal condition?

Unfortunately, for one reason or another, it was impossible in a considerable number of cases to obtain any really trustworthy account of the patients' previous history; which was therefore only recorded in sixty-six cases, or rather more than two-thirds of the whole number. In thirty-six, or somewhat more than half of these cases, the patients had at some previous time suffered either from gout or rheumatic fever, or from some form of gouty or rheumatic affection. In three other cases I ascertained that the patients had been the subjects of psoriasis or eczema, which are frequently the results of a gouty taint in the constitution, and which had probably existed in many more instances; for, as will presently be seen,

these complaints were found as actual complications of the bronchitic disease in a considerably larger proportion of our cases. Of the other twenty-seven patients only one had been in perfectly good health previous to the illness for which he came under my care during the present winter. Four dated the commencement of their tendency to bronchitis from an attack of one of the exanthematous diseases; two referred it to a previous definite attack of inflammation of the lungs; five to the inhalation of dust in the course of their industrial occupations; and only five traced it exclusively to exposure to vicissitudes of weather or to any of the other ordinary causes of taking cold. In the remaining ten cases the patients had long been liable to frequently recurring attacks of catarrh, cough, or dyspnoea, but were unable to assign any cause for the commencement of their ailments; though it seemed probable that, in several instances, the bronchial delicacy had originated in an attack of whooping-cough.

Just as in many cases we found it impossible to obtain trustworthy reports of the patients' previous state of health, so, in a still larger proportion of cases, we were unable to collect accurate and reliable facts regarding the family history; which was, therefore, only recorded in fifty-four cases. The only fact, under this head, to which I intend now specially to direct your attention, is the frequency with which other members of our patients' families were found to have habitually suffered from some other form of

pulmonary disease, or from gout. In eighteen cases there was a distinct hereditary tendency to phthisis, and in twenty-nine to bronchitis or asthma. In thirteen of these twenty-nine cases some other, often several other, members of the patient's family had also suffered from gout; a fact which is important to be observed, as bearing upon the strong tendency to bronchitis in persons of gouty constitution, which has already been brought out by the analysis of the previous history of sixty-six of our bronchitic patients.

There remains only the last point; that namely, respecting the ailments actually complicating the bronchial affection in each individual case, whilst under observation; and here, as the evidence was before us, and careful observation only was needed to ascertain the truth, we have trustworthy facts regarding all the ninety-six cases.

The bronchitis was uncomplicated in thirty-nine cases: but in fifty-seven cases, or three-fifths of the whole number, the bronchial affection was associated with some form of gouty ailment, some cardiac disease, or with some other lesion of the lungs; and, in some instances, two or more of these complications were found in the same patient. In eleven cases gout was present in its regular form, and in five there were arthritic pains and swellings, of the form commonly called rheumatic gout. Psoriasis or eczema was present in eleven, and albuminuria in eight cases.

I have already told you that psoriasis and eczema are often of gouty origin; that is to say, that they

habitually occur in persons who have either themselves suffered from gout, or in whose family there is a decided gouty taint: and I may now add, that albuminuria is also frequently induced by a gouty state of the system; and that it, in fact, coexisted with gout, or occurred in gouty constitutions, in several of the eight cases here referred to. It is, therefore, no matter of surprise to find, as I have said and as indeed many of you have had the opportunity of observing, that cases of bronchitis are often complicated with more than one of these affections at the same time; as, for instance, with gout and psoriasis, or with gout and albuminuria, or even, as in one remarkable case which I shall relate to you (Case XXIV.), with gout, psoriasis, and albuminuria all together.

There were, however, other complications to which I must also refer. In fifteen cases, nine of which showed rheumatic fever in their previous history, the bronchitis was associated with cardiac disease; in nine other cases with emphysema, and in three with phthisis.

Bronchitis is, indeed, a frequent attendant on phthisis; but I have excluded from the cases selected for my present purpose all ordinary cases of phthisis, and have only admitted the three cases last mentioned, because in each of them the bronchitis was the predominant ailment, being general and its symptoms well marked, whereas the phthisis was of limited extent and its symptoms were by no means prominent. You will recollect that we found a distinct history of phthisis in the families of eighteen of our

patients, from which it would seem that sometimes, when the family tendency has not been developed in the form of genuine phthisis, bronchitis has taken its place. Of this fact I have seen many examples; but I have also seen some very remarkable cases of the converse, in which a bronchitic parent has had phthisical children; and it will, perhaps, not be out of place here to mention briefly three instances of this which occur to me, with the full details of which I have become accurately acquainted in the course of private practice.

In the first case, both parents lived to upwards of eighty years of age; but the mother had suffered from chronic bronchitis from the age of seventeen, and all the sons of the marriage died of phthisis between the ages of twenty-five and thirty-five years. In another case, the father died of typhus at sixty-four, and the mother survived to the age of seventy-eight, though she had suffered for very long from chronic bronchitis, of which disease she ultimately died; but all the daughters, with the exception of one, died of phthisis before the age of thirty. A similar history attaches to the third family, in which the father lived to the age of eighty-six; the mother died at seventy-three, after suffering more than twenty years from chronic bronchitis; but all their daughters died phthisical in comparatively early life.

The frequent occurrence, on the one hand, of bronchitis in members of phthisical families, as shown in my analysis; and, on the other hand, of

phthisis in the offspring of bronchitic parents, as in the cases I have just related; would appear to show that the tubercular dyscrasia may be a cause of chronic bronchitis, quite independently of the existence of any actual deposit of tubercle in the lungs.

With reference to the general facts elicited by the above analysis, I would by no means be understood to authorise the assumption that similar proportions will be found always to obtain in respect of the etiology of the disease. I have myself repeatedly brought forward the fact that, in some manufacturing districts, the proportion of cases of bronchitis arising from one external cause—that of the inhalation of dust—is enormously increased. But I am, nevertheless, fully assured of the substantial truth of the views which I have given you on the subject. I am, moreover, satisfied, from long personal experience, that the proportion of cases of bronchitis arising from external causes is decidedly smaller, and that from gouty and other internal conditions of the system is decidedly larger, among the higher classes of patients whom we meet with in private practice, than it is among the working classes who form the bulk of our hospital patients.

I must now turn to the cases which I proposed to read to you in illustration of some of the various causes and relations of chronic bronchitis; and I have selected these illustrations chiefly from among the cases included in my analysis, on account of their

having been under the observation of some of you during the last three months.

First, then, I will relate an example of simple primary bronchitis, arising from a definite exposure to cold and wet, and leaving, apparently, a life-long delicacy of the bronchial membrane.

CASE I.—William F., aged thirty-five, cabinet-maker, was admitted an out-patient of the Middlesex Hospital, under my care, on October 20, 1865. At the age of ten years he fell into a pond in winter, which brought on a severe cold, and since that time he has always been subject to cough, from which indeed he is now never entirely free. This chronic cough is at any time easily aggravated by exposure to wet or inclement weather, and he is always more or less completely laid up with it every winter. There is no history of any family tendency either to pulmonary disease or to any form of dyscrasia, and he has never himself suffered either from gout or rheumatism, nor indeed from any other ailment, excepting bronchitis.

On admission, he complained much of dyspnoea, and had frequent cough, attended by the expectoration of a thin, transparent, frothy mucus. His skin was cool; pulse 74. The chest was well formed, and rose evenly and equally on both sides during inspiration: but the breathing was laborious, the sterno-cleido-mastoid and scalene muscles acting powerfully as elevators of the chest during inspiration, and the



supra-clavicular regions being at the same time depressed, so as to form deep cavities behind the clavicles. But although the breathing was thus difficult, it was not proportionably accelerated, there being only 24 respirations in a minute.

These symptoms, I may observe, are all characteristic of bronchitis. Both in pneumonia and in progressive phthisis, as I have repeatedly pointed out to you, the skin is pungently hot; whereas even in the febrile stage of acute bronchitis, when uncomplicated either with pneumonia or tubercle, although the temperature of the body may be raised, the skin seldom conveys to the hand any remarkable sensation of heat; and in chronic cases, such as the one now under consideration, frequently does not exceed the natural warmth. The pulse also in bronchitis never rises so high as in phthisis or pneumonia, and very often in cases of a chronic character does not exceed the normal frequency. Again, though the respiration is generally much quicker in the other pulmonary diseases named than it is in bronchitis, yet it is never so laborious. Even with greatly accelerated respiration, patients suffering from pneumonia are often not conscious of dyspnoea; whereas in severe bronchitis laborious respiration is the rule.

With reference to the nature of the expectoration, I should tell you that the thin, transparent, frothy expectoration, which our patient was raising when he first presented himself, is indicative, not of chronic but of recent bronchitis; or, as in his case, of a recent

accession of the disease engrafted on an old chronic affection. Examination of the sputa, which could scarcely be made in the case of an out-patient, would in all probability have shown the frothy expectoration to be more or less intermixed with the opaque, yellow mucus characteristic of chronic bronchitis. From this fact alone, I have often been enabled to judge with certainty, that an acute attack of bronchitis was only an exacerbation of long-standing bronchial disease.

In order to complete the history of this case, there are two other points to which I must briefly allude. The front of the chest was resonant on percussion from apex to base on both sides; distinct pulmonary resonance being elicited by percussion even over the cardiac region. The percussion resonance was also quite clear and normal posteriorly. The respiration was feebly heard over the left mammary region; in other situations it was sometimes harsh, and it was everywhere more or less sibilant. The heart was seen beating immediately below the xiphoid cartilage, where also its sounds were most distinctly heard; they were somewhat feeble, but quite free from murmur.

This displacement of the heart downwards and towards the right, so that its impulse was only seen in the epigastrium, was unquestionably due to pulmonary emphysema, the presence of which was indicated by the abnormal clearness of the percussion resonance over the whole front of the chest. More-

over, it seems probable, though my notes are not sufficiently definite to render it certain, that the right side of the heart was enlarged. But these are points on which it does not enter into my present purpose to dwell, though on some future occasion I hope to bring before you the relations of chronic bronchitis with pulmonary emphysema and cardiac disease.

As regards the treatment and progress of this patient, I may briefly sum them up by saying that he derived much benefit from the use of the compound squill draught\* in combination with tincture of henbane and spirit of chloroform; and that, as soon as the more urgent symptoms had abated, I substituted for these a mixture containing diluted nitro-hydrochloric acid and compound tincture of gentian, with the tinctures of larch and henbane. Under this tonic system of treatment he improved very greatly in all respects, and has for the present passed out of observation.

This case belongs to a class in which great benefit may be derived from medical treatment during the exacerbations of the chronic bronchial affection, and in which much may be done by care and proper management to retard the progress of this latter; but in which also the disease itself has been too long

\* The compound squill draught of the Middlesex Hospital Pharmacopœia consists of tincture of squill fifteen minims, spirit of nitrous ether one fluid drachm, solution of acetate of ammonia two fluid drachms, and pimento water nine fluid drachms.

and too firmly established to give us much hope of being able to effect a permanent cure, especially in persons necessarily liable to undue exposure. I have little doubt that on the first such occasion our patient will suffer a fresh aggravation of his malady, and will either find his way back to us, or seek relief at some other hospital.

The history I have just given you is that of one of the few cases included in my analysis (only five, as you will remember, out of sixty-six) in which the patients appeared to have contracted chronic bronchitis from exposure to causes of taking cold, without having any special predisposition to that disease, arising either from long-standing mechanical irritation of the bronchial membrane, from constitutional tendency, or from previous illness of some other kind.

Such cases are, indeed, so exceptional that I meet with but very few of them either in private or in hospital practice. Acute bronchitis is undoubtedly often excited by a severe catarrh from some temporary cause, or from some accident such as befell William F.; but, where the disease becomes chronic, there is almost invariably found to exist also, if the history can be fully traced, a predisposing cause in one of the conditions I have named.

I shall next relate a case of primary chronic bronchitis arising from mechanical irritation of the bronchial membrane, produced by the habitual inhalation of dust. We have fewer and less striking examples of bronchial disease from this cause in the metropolis

than in many of the mining and manufacturing districts; but the following case is sufficiently clear as to the origin of the illness, and I have chosen it on account of the marked absence of any constitutional predisposing cause, in the patient himself or in his family.

CASE II.—Thomas L., aged fifty-two, stone-mason, was admitted an out-patient of the Middlesex Hospital, under my care, in December 1866. The family history was satisfactory; his parents having both lived to an advanced age, and neither of them having suffered from any form of dyscrasia or of pulmonary disease. The patient himself had never been affected with either gout or rheumatism, and had, in his own opinion, been a healthy man until within a year of the time of his admission. I found, however, that for many years he had been accustomed to raise a little thick, dark mucus early in the morning, and had more lately become prone to slight catarrhal attacks, attended by cough. His occupation during life has mainly consisted in hewing various kinds of stone, during which process a great deal of grit and dust is thrown off. He was laid up last spring for a month with a more than usually severe catarrhal attack, and, from that time, has had a constant expectoration of thick, yellow-coloured mucus, and has suffered more or less from dyspnoea, especially on moving about; but has never had hæmoptysis, nor even a streak of blood in his expectoration.

On admission, his skin was cool; pulse only 72, small and compressible; tongue clean; bowels regular. The cough and dyspnœa were both troublesome, and the expectoration thin, yellow, and copious. In front the chest was quite normally resonant on percussion from apex to base on right side, and to fourth rib on left side, below which it was dull. The heart's apex was seen and felt beating in its normal position; but the impulse was more diffused than in health, and a faint systolic murmur was audible at the left apex. There was also deficiency of resonance over the base of the left lung posteriorly, from the angle of the scapula downwards. Sibilus and rhonchus were audible over the upper parts of both lungs and in the base of the right lung; but very little air entered the base of the left lung. No moist nor crepitating sounds were heard in any part of the chest.

This is a quite characteristic, though not very far advanced, case, of chronic bronchitis arising from long-continued mechanical irritation of the bronchial membrane by the inhalation of grit. There had been for years, as is usual in such cases, a chronic bronchial affection of by no means a severe character, but which had gradually rendered the membrane more and more delicate, and more prone to the invasion of active disease from any slight exciting cause. This had not disabled the man from following his ordinary occupation, and had not, therefore, been regarded by himself as an ailment, until

a sudden aggravation of the symptoms laid him up entirely for a time. This later stage of the disease, in which the patients are often temporarily disabled from work, sometimes comes on very gradually without any additional exciting cause; but it is much more frequently accelerated, as it seems to have been in this instance, by an attack of catarrh.

In this case I must draw your attention, lastly, to the circumstance that there was pneumonic consolidation of the lower lobe of the left lung, denoted by the deficiency of resonance, and by the absence of the bronchitic sounds in that region. This must have taken place, at latest, during the patient's illness in the spring, which doubtless was an attack of broncho-pneumonia; for, when he came under my care there was no active pneumonic disease going on; and, although the cough and expectoration have now greatly diminished and the patient has improved much in general health, the dulness on percussion has undergone no material change since I first examined him. It is not, indeed, likely to disappear, but it may make no further definite progress for a long time if our patient should escape future catarrhal attacks.

This tendency to remain for an indefinite time in a perfectly quiescent state is peculiar to the consolidation of lungs consequent on pulmonary disease excited by mechanical irritation, and frequently enables the patient to continue his ordinary labour to a

very late stage of the complaint, as was strikingly illustrated by the case of another patient who was sent into the hospital, under my care, by my colleague Dr. Sanderson last autumn.

CASE III.—William T. F., aged thirty-eight, stonemason, formerly French millstone maker, was admitted into Founder Ward on September 21. He had considered himself a healthy man until about ten weeks before his death; though he had for twenty years been subject to morning cough, attended by a scanty transparent expectoration, but not, according to his statement, by any shortness of breath. He took cold eight weeks before his admission, when his cough suddenly became much worse, the expectoration copious and muco-purulent, and he lost flesh rapidly.

On admission his skin was cool; pulse 78, small and compressible. The expansion of the chest in respiration was deficient, but it was equal on the two sides. The percussion resonance was deficient over the upper and anterior part of the thorax; also posteriorly over the whole left side, most markedly in the supra-scapular region; and in a less degree likewise over the right side. The vocal fremitus was increased in the sub-clavicular and supra-scapular regions on both sides; and there was bronchophony at the left nipple. The respiration was dry and harsh, and the sound of expiration much prolonged over the whole chest. There was coarse crepitation over a limited space near the left nipple, and also occa-



sionally, on deep breathing, in the left supra-scapular region. The heart sounds were normal.

A few days after his admission the expectoration contained some streaks of blood; but his appetite continued good, his skin was cool and moist and his pulse quiet. On the 8th of October he had a severe attack of diarrhœa and, on the following day, I found his pulse quick and feeble, his features shrunken and his skin cold. Towards evening profuse hæmoptysis supervened, under which he rapidly sank and died the same night.

This history told clearly that the bronchial affection had been of long standing, and that pulmonary disease was very far advanced; and both these facts were confirmed, beyond question, by the results of the post-mortem examination which was very carefully made by Dr. Cayley.

The lungs, more particularly the posterior parts, were externally much darker than usual, and were studded with black pigment patches. The anterior borders of both lungs were emphysematous. The posterior surface of the left lung, from a little below the apex to the base, was firmly adherent, but otherwise the lungs were free from adhesions. The apices of both lungs were puckered and presented several cicatrix-like folds, around which were emphysematous bullæ.

The lower and posterior parts of both lungs were consolidated into a dense, hard tissue, of gristly consistence and almost coal-black colour, which im-

parted a slight feeling of grittiness on being cut through. The freshly cut surface was remarkably smooth, and presented a somewhat mottled appearance; the black hue being diversified by irregularly arranged lines of an iron-grey colour. The bronchial tubes, in the consolidated portions of lung, were dilated and thickened. In the lower lobe of the left lung, there was a deep-seated irregular cavity, about two inches in its long diameter, the walls of which were shreddy and black. The crepitant portions of both lungs were also very dark, and studded with patches of black pigment. Scattered here and there in the crepitant portions, were small solid nodules, varying from the size of a split pea to that of a small bean, which on section were found to be pale in colour and of firm consistence.

The mucous membrane of the larger bronchial tubes was slightly injected.

On microscopic examination of a small portion of the dense hard tissue, it was seen to consist of elastic fibrous tissue, abundantly intermixed with granular exudation cells, and with black pigment; the latter being, in some places, arranged in well-defined roundish masses, and in others, in the form of fine granules. Sections of the lungs, taken at the junction of the solid and crepitant portions, showed thickening of the walls of the air-cells with a deposit of black pigment in their substance. The small pale-coloured nodules, found in the crepitant portions of the lungs, had the character of chronic inflamma-

tory exudations; they consisted of nucleated cells and nuclei, granular matter and cells containing oil globules, interspersed with a little fibrous material and black pigment.

Microscopical and chemical examination of portions of the lungs demonstrated the presence of minute, angular, siliceous particles, in considerable quantity, embedded in the lung tissue.

With these appearances no one could hesitate to believe that the bronchial disease had originated in the cause assigned, that it had been of very slow progress, and that, while giving rise to no prominent symptoms, it had yet imperceptibly brought about a condition of lungs which rendered the first catarrhal attack a fatal illness.

I have several other cases of this kind, too instructive to be passed over, which I must reserve for my next lecture.

## LECTURE II.

*BRONCHITIS FROM MECHANICAL IRRITATION.*

PULMONARY CONSOLIDATION A COMMON SEQUEL OF BRONCHITIS FROM MECHANICAL IRRITATION—INSIDIOUS COURSE OF DISEASE—GRINDER'S BRONCHITIS: SUPERVENTION OF PNEUMONIA; OF GRINDER'S PHTHISIS—DISTINCTION BETWEEN GRINDER'S PHTHISIS AND TRUE PHTHISIS—PULMONARY CONSOLIDATION MORE FREQUENT IN BRONCHITIS EXCITED BY INHALATION OF GRITTY PARTICLES—BRONCHITIS EXCITED BY INHALATION OF LIGHT DUST, MORE FREQUENTLY UNCOMPLICATED—PROGRESS OF DISEASE MUCH INFLUENCED BY CONSTITUTIONAL TENDENCIES—BRONCHITIS FROM INHALATION OF UNWHOLESOME AIR—REMARKS ON TREATMENT.

GENTLEMEN,—At the conclusion of my recent lecture I gave you two examples of chronic bronchitis, arising directly from mechanical irritation of the bronchial membrane, caused by the inhalation of dust. I propose, to-day, to resume the subject, and I shall presently bring before you a patient actually suffering from pulmonary disease, engendered by this cause.

You will remember that the two patients, whose cases I related, both presented evidence of pulmonary consolidation, in addition to bronchial disease; and that, in the second case, the existence of this condition was verified by post-mortem examination. You might, therefore, be inclined to doubt whether they could fairly be classed as cases of chronic bron-

chitis, and it is certain that they were not cases of bronchitis only at the time that they came under my observation; the parenchyma of the lungs having then become as manifestly diseased as the bronchial membrane itself. But experience has convinced me that, in these cases, the pulmonary disease always begins as bronchitis; though, either insidiously, from the permeation of mechanical particles into the lungs, or else more suddenly, as the result of catarrhal inflammation, the lung-tissue does often eventually become diseased and consolidated.

Persons in these circumstances often suffer, for many years, only from chronic cough and expectoration; until, at length, the occurrence of some catarrhal attack, to which the condition of the bronchial membrane renders them very liable, suddenly disables them entirely from work. I have usually found that such patients, when driven at length to seek medical aid, date the first commencement of their illness from the recent catarrhal attack which has only aggravated their condition; ignoring altogether the cough, expectoration and shortness of breath, to which they have gradually become inured during the slow development of their disease.

This was pre-eminently the case with the patient, William T. F. (Case III.), who died in Founder Ward last autumn. He persisted that he had been in good health, until he took cold, eight weeks before his admission into the hospital; although we found, upon strict enquiry, that he had suffered from morn-

ing cough for nearly twenty years; and the post-mortem appearances placed beyond doubt that the disease must have been of long standing, and of very slow progress.

I had under my care in the hospital, several years ago, a patient whose case so fully exemplifies what I have explained to you, respecting the commencement of this form of pulmonary disease in chronic bronchitis, that I shall quote it in illustration of my remarks.

CASE IV.—Thomas R., aged thirty-eight, a tool-grinder from Wolverhampton, became an out-patient of the Middlesex Hospital, under my care, on May 19, 1863. He had worked as a grinder from boyhood, exclusively upon a wet stone, but had inhaled air loaded with fine stone grit, whenever he needed to prepare his grind-stone; a process which is performed whilst the stone is dry. He had suffered for many years from shortness of breath; but from cough and expectoration only during the last three years, during which time the difficulty of breathing had also much increased. He stated himself to be of temperate habits.

On admission, the patient showed no emaciation; his skin was cool, pulse quiet, and urine normal. His chest was somewhat flat in front, but expanded equally on both sides. The percussion resonance was normal over the whole chest, both in front and

behind. The respiration was slightly laborious. The breath-sounds were harsh, more particularly in the right lung; and bronchitic cooing sounds were heard in the lower lobes of both lungs posteriorly. The heart was in its normal position, and its action and sounds were healthy. The expectoration was white, semi-transparent, and tenacious.

Early in June he had an attack of pleuro-pneumonia in the right lung, for which he was admitted as an in-patient for three or four weeks. His illness, whilst he was in the hospital, presented no unusual features; but, as the pneumonia subsided, the expectoration assumed the frothy appearance characteristic of acute bronchitis, and was found, on microscopical examination, to contain small fragments of lung tissue.

On July 4, when he returned to the out-patient room, he was thinner than when he first presented himself, but still by no means emaciated. His skin was cool and his pulse 80. He had frequent short cough with bronchitic expectoration. There was now slight dulness on percussion in both infra-clavicular regions, but somewhat more marked on the right side. There was also diminished expansion of the upper part of the thorax on both sides. The respiration was harsh over the left lung, the lower lobe of which was imperfectly permeated by air. In the right sub-clavicular region the respiration was tubular and scanty crepitation was heard. The re-

spiration was harsh over the remainder of the right lung, which was well permeated by air.

He was ordered a draught containing nitro-hydrochloric acid, the compound tincture of gentian and the tinctures of larch and henbane; to be taken together with a tea-spoonful of cod-liver oil, three times a day. I also directed the back of the thorax, on the left side, from the spine of the scapula downwards, to be painted with solution of iodine twice daily.

On the 11th he was progressing favourably. His cough was less troublesome and the expectoration had greatly diminished. Air permeated the lower lobe of the left lung more freely. Expiration was prolonged in the upper lobes of both lungs. Loud sonorous rhonchus was audible in the left infra-clavicular region; the crepitation below the right clavicle was now only heard during cough or forced inspiration.

On the 30th he still had much shortness of breath and occasional cough, attended by a scanty, opaque expectoration. The dulness on percussion and diminished expansion of the thorax remained unaltered. The respiration continued harsh in both lungs, no moist sounds were now audible; the crepitation in the apex of the right lung had entirely ceased.

Considering himself convalescent, the man returned to Wolverhampton early in August, with the intention of resuming his occupation.



Before offering any remarks on this case, I will show you a young man who is suffering from the same disease, produced by the same cause. He has been under my care for more than two years, so that we have a good history of the case as it has progressed under our constant observation. Many of you have already seen and examined him in the out-patient room, where I have, on several occasions, made use of him for my practical demonstrations on the physical diagnosis of diseases of the chest.

CASE V.—Edward W., aged twenty, tool-maker, became an out-patient of the Middlesex Hospital, under my care, September 15, 1865. His family were all healthy. He had worked at tool-making for eleven years, and had been exposed to inhale dust, consisting of minute particles of steel and grit, in several of the processes in which he was engaged. He had been suffering from cough and dyspnoea for several months.

At the time of admission his shoulders were rounded and his chest was rather flat anteriorly below the clavicles. The right side of the thorax expanded more fully than the left in deep inspiration. The percussion resonance was quite clear below both clavicles and over the whole front of the thorax; it was also clear posteriorly. The apex-beat of the heart was felt below the nipple; the heart-sounds were clean. The breath-sounds were harsh, and the expiration was prolonged over the front of the thorax. Moist

crepitation was audible in the base of the left lung posteriorly, but in the base of the right lung the respiration was dry and sonorous. The expectoration was thick, opaque and of a yellowish colour. Pulse 73, of good volume; respirations 28; skin cool; tongue clean. The patient said that he had lost flesh and perspired easily. His weight was 7 st. 11 lbs.

He was ordered the nitro-hydrochloric acid draught, with ten minims of wine of ipecacuanha and twenty of tincture of henbane to be taken three times a day with one drachm of cod-liver oil.

On October 13, his cough was still troublesome, but the expectoration had become more scanty. Pulse 76. The dose of cod-liver-oil was increased to two drachms.

Four weeks later he said that he had little cough except in the morning after first rising. The expectoration was of the same character as before, but much diminished in quantity. His skin was cool; pulse 72, of good volume; respirations 25. The percussion resonance remained clear. The respiration was harsh and dry; there were no longer any moist sounds. His weight had increased to 8 st.  $3\frac{1}{4}$  lbs. The same treatment was continued.

By December 29, there was marked improvement; he had scarcely any cough after the early morning and no expectoration but a little, thin, light-coloured mucus. He said that he was able to work again as well as ever, but that he had for some time avoided working in dust. His weight was now 8 st. 6 lbs.

On February 28 of the next year (1866), he complained much of difficulty of breathing, especially on going up stairs, although he had but little cough and expectoration. There was now slight deficiency of resonance in the infra-clavicular regions. The sound of expiration was much prolonged over both lungs anteriorly and posteriorly. His skin was cool; pulse 72.

On January 4, 1867, there was evident flattening of the chest below both clavicles, more particularly the left; and the left side of the chest expanded less freely than the right. The percussion resonance was somewhat deficient on both sides. The respiration was harsh, and expiration prolonged over both lungs. There were no moist sounds. His cough was not very troublesome and the expectoration was scanty, but he had much shortness of breath on exertion. He weighed 8 st. 2 lbs. He was ordered a drachm of syrup of iodide of iron with two drachms of cod-liver oil three times a day, and five grains of compound pill of hemlock at bed-time.

On February 22, he said that he had taken cold, and his skin was rather warm. Rhonchus was audible in the base of the left lung and also scanty crepitation after coughing. The compound senega draught\* was now given with the hemlock pill.

\* Take of carbonate of ammonia four grains, tincture of squill fifteen minims, pimento water half a fluid ounce, infusion of senega one fluid ounce.

On May 3, dulness on percussion was evident in both supra-spinous fossæ. There was greater deficiency of resonance below both clavicles; the respiration was everywhere harsh and tubular, and slight crepitation was heard in the apices of both lungs on forcible breathing. His weight was only 7 st. 7 lbs. He had then for some time resumed the syrup of iodide of iron and the cod-liver oil.

On June 15 his cough was more troublesome and he stated that he had had an attack of hæmoptysis the previous week. Crepitation was audible at the left nipple. There was increased vocal vibration all over the chest. His pulse was 100, and he had greater difficulty of breathing on exertion.

He reports to-day that on November 26 he had another attack of hæmoptysis; he had continued until then to work at his employment. The physical signs have undergone little change, but the dulness on percussion has somewhat extended and the crepitation in the apex of the left lung has acquired a metallic tone. His skin is now cool and pulse only 80. He has not lost flesh since May.

We have thus been able to watch the steps by which this patient's disease has advanced up to the present time. If, when he first came under my care, he had discontinued his employment and sought for some out-door occupation, as I recommended him to do, he might possibly still have recovered, or his life might at least have been indefinitely prolonged. The disease, however, has now taken such hold on his lungs

that all hope of arresting it must be abandoned, though something may still be done to retard its progress.\*

Both these last cases are characteristic examples of the course and progress of the form of disease we are now considering. Starting, as I have said, from the mechanical irritation of the bronchial surface by the gritty particles inhaled, it presents in its earlier stages only the symptoms and signs of chronic bronchitis; but, frequently, at a later period exhibits also those of consolidation of the lungs. In very advanced stages the physical signs are often those of phthisis, and, in fact, 'Grinder's Rot' and 'Grinder's Phthisis' are the names commonly given to this complaint. From true phthisis, nevertheless, it may be distinguished by its slow chronic character, and also by the comparatively slight degree of constitutional disturbance attending its progress, which bears no proportion to the intensity of the physical signs. There is seldom any emaciation until quite the later stages of the disease, and in all the cases I have seen, except during intercurrent attacks of acuter illness or in the

\* I subjoin my latest note of this patient's case. September 25, 1868. Much emaciation, skin warm, pulse 100, respirations 38. Chest altogether shrunk and flattened below nipples, as well as below clavicles. Apex of heart felt beating in normal position. Muscles of neck act violently in respiration; chest expands very little. Dulness on percussion below both clavicles and in both supra-spinous fossæ. Harsh breathing throughout both lungs, and crepitation in the upper lobes; the crepitation in the left lung has a dry metallic character.

very last stage, the skin has been cool and the pulse quiet.

I have observed that, in cases of this character, consolidation of lungs seems more especially liable to be superadded to the bronchitis, if the patients are exposed to inhale grit, or any of the heavier kinds of dust; whilst, in those persons whose occupation exposes them only to the lighter kinds of dust, the bronchitis more frequently remains uncomplicated.

If I am correct in this observation, the different course of the disease, in the two classes of cases, is probably due to the fact of the lighter kinds of dust being expelled again with the expectoration secreted by the irritated bronchial membrane; whereas much of the heavier, and often sharply angular, dust, in place of being expelled, gradually makes its way through the bronchial walls into the pulmonary tissue, setting up irritation and its consequences there as surely as in the bronchial membrane itself. I have examined several specimens of grinders', stonemasons', and miners' lungs, in which gritty particles were seen under the microscope, embedded in the consolidated tissue; and on chemical examination, in which I have had the skilled aid of my colleague, Mr. Heisch, these have proved to be crystallised particles of silica which polarised light.\*

I will now give you one or two cases of bronchitis

\* For details of these investigations see the *Pathological Transactions*, vol. xvi pp. 59, 60, and vol. xvii. p. 24 and pp. 34-38.

produced by the inhalation of the lighter kinds of dust; in which, as you will see, the complaint was much more tractable, and more completely relieved by the discontinuance of the unhealthy occupation, than in the cases which we have hitherto been studying.

More than ten years ago, when physician to the Western General Dispensary, I became acquainted with the fact that a very large proportion of the chaff-cutters of London suffer, and ultimately die, from bronchitis and its consequences. I had, at that time, the opportunity of making two post-mortem examinations of patients who had died of bronchitis arising from this cause; and I found their lungs voluminous, emphysematous, and without any signs of consolidation. In a third case, that of a man who had been under my care for three years, during which period he had two attacks of pleuro-pneumonia, the posterior parts of the lungs were found to be the seat of iron-grey consolidation. Since I became attached to this hospital, I have seen comparatively few cases of chaff-cutters' bronchitis, but I will give you the notes of one which is sufficiently characteristic.

CASE VI.—Richard M., aged forty-seven, chaff-cutter, became an out-patient of the Middlesex Hospital, under my care, on April 24, 1863. His business consisted in going round to the stables of his customers to cut chaff for their horses, and the air he breathed whilst at work was loaded with dust given off

by the hay and straw during the process of cutting. He stated that he had followed this occupation for ten years and had usually worked eight hours a day. He had long suffered habitually from cough and tightness of chest, and latterly also from difficulty of breathing.

At the time of admission his skin was cool and pulse quiet. The expectoration was scanty, opaque, and of a yellow colour. The chest was normally resonant on percussion, both in the anterior and scapular regions; but there was a slight degree of dulness over the bases of both lungs posteriorly. The breath sounds were feeble in the apex of the right lung, harsh in the apex of the left. The respiration was tubular near the right nipple, and coarse crepitation was heard over a limited space near the left nipple. There was fine crepitation in the base of the right lung and large mucous crepitation in the corresponding part of the left lung. Urine normal. He was ordered to take the compound senega draught with ipecacuanha wine, and was further advised to discontinue his occupation, at least for a time.

A fortnight later he was found to be improving and was then ordered to take, three times a day, a drachm of cod-liver oil floating on a draught composed of the compound tincture of gentian, nitro-hydrochloric acid, ipecacuanha wine and compound tincture of camphor.

On May 22 he had been quite free from exposure to chaff-dust for a month, having left his work since the day he was first seen. His aspect was much



improved and the cough and dyspnoea had greatly decreased. The moist sounds in the base of the left lung had given place to harsh, dry respiration, the crepitation near the left nipple had disappeared, and the fine crepitation in the base of the right lung had become coarser and less extensive.

He continued to improve until near the end of June, when, considering himself convalescent, he ceased his attendance at the hospital and resumed his work.

I had under my care, at the same time, a patient who remained under observation for a much longer period, and the history of whose case is conclusive as to the cause of his complaint and the effectual remedy for it.

CASE VII.—Thomas T., aged twenty-two, machinetenter, was admitted an out-patient of the Middlesex Hospital, under my care, on June 12, 1863. His work consisted in attending machines through which cotton, wool and feathers are passed for the purpose of being teased and cleansed, previous to being made up into mattresses and feather-beds. The several materials are rapidly whirled, and shaken about during the process; and, although the machines are closely covered, much dust of a light character and many fibrous particles escape into the air of the workshop. He had only followed this employment for two years and had previously been quite healthy, but had

frequently during the last two years suffered from bronchial irritation. For several months before his admission he had been much troubled by difficulty of breathing and by cough attended by an opaque mucopurulent expectoration, which of late had been frequently streaked with blood.

On admission he had an inflamed sore throat, and a husky voice. His chest was well-formed and normally resonant on percussion over its whole anterior aspect; posteriorly the resonance was also clear. The breath-sounds were dry and sibilant in front; sonorous rhonchus was audible behind, in the lower lobes of both lungs and on the left side as high as the scapula. No moist sounds were anywhere heard.

He was put under nearly the same medical treatment as the chaff-cutter; and was advised, if possible, to change his occupation, which in the meantime he agreed to discontinue.

On June 26, the cough and expectoration had decreased. Rhonchus was still audible between the scapulæ and in the lower lobes of both lungs. The respiration over the front of the chest was still dry and sibilant; expiration prolonged.

By July 10 the rhonchus in the back had much diminished. The patient then went to the Convalescent Institution at Walton-on-Thames; and, on his return, reported himself as quite well and resumed his work, which he persevered in for several weeks.

On September 11 he was re-admitted with much cough, shortness of breath and wheezing, especially at night. The expectoration was more copious than before, thin and frothy. He said that his present attack had come on gradually, the first symptoms having been pain and oppression in the sternal region, which had appeared almost as soon as he recommenced work. There had been no hæmoptysis. His chest continued normally resonant on percussion; the respiration was harsh and sibilant as before. The necessity of abandoning his present occupation if he desired to enjoy good health was again impressed upon him.

On September 25 he informed me that he had been transferred to another department of the factory, and there was already a manifest improvement in his condition; the cough and expectoration having much abated. He was discharged well early in November, and I have had the opportunity of ascertaining at intervals, during a period of nearly three years, that he has continued in good health.

I shall read you the notes of one more case of chronic bronchitis arising from the cause we are considering. The patient was engaged in a branch of industry which had not attracted notice, as a cause of chronic bronchitis, until I drew attention to it, some years ago, in the pages of the 'Medical Gazette.'

CASE VIII.—John L., aged thirty-one, paper-stainer,

was admitted an out-patient of the Middlesex Hospital under my care August 7, 1864. His work consisted chiefly in applying bronze powder to wall-papers; during which process the air he breathed became charged with fine bronze dust. He said that all the men employed in the same manner were liable to chronic cough, and that he had himself, for the last five years, had almost constant cough; attended by a copious, thick, white expectoration, but not, until latterly, by much difficulty of breathing.

At the time of admission his voice was hoarse, skin cool, pulse 76. His chest was well-formed, expanded properly in respiration and was normally resonant on percussion on both sides. The breath-sounds were harsh, dry and sibilant, throughout the upper lobes of both lungs. He was ordered the draught I had found useful in similar cases, containing nitro-hydrochloric acid, tincture of gentian, ipecacuanha wine and tincture of henbane.

On August 21 he had much less cough, but the expectoration continuing copious I added twenty minims of tincture of larch to his draught; and, his more urgent symptoms being soon relieved, he discontinued his attendance after September 4.

He presented himself again at the hospital on October 2, complaining of a fresh accession of cough, expectoration and dyspnoea. The physical signs and the sounds of respiration were much the same as at his first admission. He was ordered to resume the draught with the tincture of larch and was

strongly urged to endeavour to change his occupation.

On October 23 he was again much better; the cough and dyspnoea were less troublesome and the expectoration much diminished in quantity.

From that time, having been removed to another branch of work, he continued to recover steadily, and on December 15 said that he was quite free from cough, expectoration and shortness of breath. The respiration continued harsh and dry, and the sound of expiration was abnormally distinct; but neither sibilus, rhonchus, nor any moist sounds were heard in the lungs, and the chest was everywhere normally resonant on percussion.

You cannot fail to have remarked the very different degrees of rapidity with which the disease advanced in the several cases I have quoted; and you have already heard that this difference is due, in part, to the more or less frequent occurrence of catarrhal accidents. Other circumstances peculiar to the patient, such as age, habits of life and constitutional tendencies, are not without great effect on the progress and course of the disease; and, of these, the last named especially exercise a most important influence in promoting and modifying its development. You will easily understand that the existence of any constitutional conditions, predisposing to bronchitis, must lessen the power of resistance in the bronchial membrane to the mechanical irritation exerted upon

it; and, thereby, not only hasten the development of the disease, but add to its severity. On the other hand, if there be any tendency to tubercular disease, I can conceive nothing more likely to light it up in the lungs than such chronic bronchial irritation; and I have, in fact, in a few instances, seen the constitutional tendency, and the mechanical exciting cause in operation together, and have only been enabled by the history of the case to determine the co-existence of the two factors.

I must not altogether omit to notice one other external exciting cause of bronchitis, I mean the inhalation of hot, over-dried air, or of some noxious vapours. It happens indeed that no case of bronchitis arising from either of these causes has occurred amongst those which are included in my analysis, but such cases are by no means uncommon; and, in order to render this branch of my subject more complete, I shall quote a very remarkable case which came under my observation some years ago, and which is only one of many within my own personal experience.

CASE IX.—Donald M., aged fifty-eight, house-painter, was admitted an out-patient of the Middlesex Hospital, under my care, on March 28, 1862. The patient said that he had no personal nor family tendency to cough, and had been a perfectly healthy man until the spring of 1861, about twelve months before I saw him, when he was employed to repaint the inside of a

large public building, which was being dried by means of open braziers burning a mixture of coke and charcoal. He very soon began to suffer from bronchial irritation, excited by breathing the air impregnated with the unwholesome fumes evolved by this combustion; and, before he had completed the job on which he was engaged, he suffered severely from cough, expectoration, and dyspnoea, which had continued up to the time of his coming under my care.

On admission his respiration was very laborious, the dyspnoea was great, and the cough and expectoration were most troublesome. The chest was everywhere resonant on percussion, and bronchitic sounds were heard throughout almost all parts of both lungs; the respiration was harsh, and expiration generally prolonged. The man looked ill and was much emaciated, but the apex of the heart was felt beating in its usual position, and there was no reason to believe in the existence of any considerable degree of emphysema. The case, in fact, when I first saw it, was one of primary chronic bronchitis produced solely by the cause I have stated. The urine being perfectly normal, I desired a blister to be applied to the sternum, and ordered him a five-grain compound hemlock pill at bedtime, and a draught to be taken three times a day, containing half a drachm of compound tincture of gentian, ten minims each of diluted nitro-hydrochloric acid and ipecacuanha wine, with twenty minims each of the tinctures of larch and henbane in an ounce and a half of water.

Under this treatment the patient improved most satisfactorily, and was discharged convalescent in about seven weeks; but, in consequence of exposure to a severe chill, returned again at the end of another month, suffering from a more acute attack of bronchitis. There was now much dyspnoea and a very troublesome cough, attended by a glairy, frothy expectoration. The chest was everywhere normally resonant, but bronchitic cooing sounds were audible over the whole of both lungs. The skin was cool and pulse quiet. I was now obliged to use different means, and prescribed a mixture of solution of acetate of ammonia, ipecacuanha wine, antimonial wine, and compound tincture of camphor in camphor water, to be taken every six hours; directing the patient at the same time to confine himself to the house, and to apply over the whole back of the thorax a large linseed poultice, with a twelfth part of powdered mustard, renewing the application every few hours as it became cold.

In ten days the acute symptoms had much abated. Rhonchus, with prolonged expiration and creaking in the lower lobes of both lungs, had superseded the cooing sounds previously heard, and the expectoration, though copious, had become opaque and of a yellow colour; but there was still much cough and dyspnoea. The time was come to revert to the tonic treatment which had been so efficacious in the chronic stage of the complaint for which he had first sought relief; and I gave him the same ingredients, in



somewhat larger doses, with the same successful result. The cough and dyspnoea rapidly decreased, the expectoration diminished in quantity, and the man gained flesh and acquired the aspect of health. In a few weeks he was discharged, being then free from cough and dyspnoea, and apparently quite well. He still, however, raised a small quantity of clear bluish mucus on first rising in the morning, and the respiration remained harsh, and the expiration somewhat prolonged, throughout both lungs.

Upwards of three years have now elapsed since his discharge; and, unlike the majority of my patients of this class, he has not again presented himself: but, nevertheless, I can scarcely believe that he has remained perfectly well; for his occupation exposes him to many causes of taking cold, and it is unlikely that an attack of bronchial irritation, which had lasted upwards of a year, should have passed away without leaving a strong predisposition to suffer from such causes; more particularly as the breath-sounds had not altogether regained the character of health.

The cases I have read to you to-day all belong, as I told you in my last lecture, to a class of which, except in certain districts, you will not find marked examples common, even among your poorer patients; and it may seem to you that they have little practical bearing upon the cases of bronchitis you are likely to meet with in private practice. I am, however, persuaded that the causes of the bronchial affection in

all these patients are, within certain limits, in much commoner operation than might at first sight be supposed. Few private patients, it is true, are exposed to these noxious influences in sufficient intensity to excite bronchitis directly; but very many unsuspectingly inhale dust or bad air in a degree which gradually produces slight bronchial irritation, and renders them exceedingly liable to contract bronchitis on exposure to any immediate exciting cause. Even the habitual travelling along a dusty road is apt to have this effect; and the constant breathing of hot and dry air in dwelling-rooms, especially if combined, as is too common, with imperfect ventilation, is a fruitful source of the same tendency. The employment of gas-lights in sleeping apartments, or even in sitting-rooms, unless proper appliances be in use for carrying off the products of combustion and for admitting fresh supplies of pure air, produces an atmosphere in some degree analogous to that which was the cause of illness in the painter Donald M. (Case IX.)

These are things of no small consequence to be borne in recollection in private practice. It is still common for bronchitic persons to shut themselves up in close, hot rooms, and breathe impure, because imperfectly renewed, air, with the idea of thereby avoiding draughts; although, by so doing, they, in fact, aggravate their ailments and defer their cure. Doubtless there are cases in which we are compelled to keep our patients for a time in an artificial tem-

perature: but, whilst the air of their apartments should be warm, it should never be allowed to become either dry or close; both of which conditions tend to increase any existing bronchial irritation. Even the simple device of keeping a kettle of boiling water on the fire, with a spout long enough to throw a constant jet of steam into the room, will suffice to moisten the air; and, with proper contrivances of screens or curtains to ward off draughts, free ventilation may always be obtained without danger to the most susceptible patient.

By far the greater number of bronchitic patients, however, actually do better when not kept in rooms at a high temperature; inasmuch as they sustain less injury to their general health, and are able to go about earlier, and with less risk of taking cold from any slight exposure, than those who have been so confined. It is not so much a warm atmosphere that is needed by bronchitic persons, as ample protection from chilling of the surface; and this may be secured by suitable clothing. In fact, as a rule, I have found that, other things being equal, chronic bronchitis is slower in its progress, and less speedily affects the general health, in persons whose duties take them much out of doors, than in those who, from their indoor occupations, would generally be presumed to be less exposed to causes of taking cold and, therefore, less liable to accessions of their complaint.

I have left myself but a brief space for remarks on

treatment, and must therefore restrict myself for to-day to a few observations on the therapeutic agents used in the cases I have read to you. When patients come under treatment with a recent accession of catarrh engrafted upon a chronic bronchial affection, I find it best to act at once upon the skin, to promote expectoration, and to soothe the irritated membrane. For these purposes, if the pulse be of good volume, and the patient's strength not impaired, I usually in this stage of the disease prescribe a diaphoretic mixture, containing solution of acetate of ammonia, antimonial wine and tincture of henbane or compound tincture of camphor; and sometimes, in addition to these, a small dose of wine of ipecacuanha. If, however, the patient be feeble or depressed, I often give the ipecacuanha without the antimony; and again in other cases, when ipecacuanha produces, as it sometimes does, distressing nausea, I have recourse to very small doses of antimony combined with spirit of chloroform in an effervescing draught; and these I have found useful, even though the patient were somewhat feeble. In all cases, whenever the skin becomes moist, and free secretion is established from the bronchial membrane, I omit the antimony entirely.

Somewhat later in the progress of such cases, and from the very beginning of the less acute accessions which often occur in persons who have long been subject to chronic bronchitis, I find the more stimulating expectorants, such as squills, the most effectual.

But in almost all cases of chronic bronchitis a time arrives when expectorants cease to be useful. The expectoration indeed continues, but is rather of the nature of an habitual flux from the bronchial membrane than the result of active irritation. The treatment now required is of a tonic character, and zinc, iron, or quinine, will all of them at times be most useful: but I have long been accustomed to prescribe with great advantage the mineral acids, especially nitro-hydrochloric acid, in combination with a vegetable bitter; retaining frequently the ipecacuanha and henbane.

In chronic cases attended by very copious expectoration, such balsamic medicines as ammoniacum, copaiba, Canada balsam, and benzoin, are often of great service: but, as they are apt to disagree with the stomach, and as the digestive powers in such cases are often very feeble, I have for the last eight or nine years habitually used, in their stead, the tincture of larch, which has no such tendency, and which I have found at least equally serviceable in regard to the bronchial affection. Its effect is not only to lessen the expectoration, and with it the cough and dyspnoea, but also apparently to restore the debilitated membrane to a more healthy tone, and to render patients less liable to catarrhal attacks at every change of weather or season. In Cases IV. and VIII. I used it with obvious advantage, and its effects have been striking in many other cases, some of which I hope at a future opportunity to bring before you.

I must not omit to explain a remark which I made, with reference to the application of a blister to the sternum, in the last case. I assigned as my justification that the case was one of primary bronchitis, and that the urine was perfectly normal; and I take this opportunity of cautioning you against the indiscriminate use of blisters in bronchitis. Although they may sometimes be employed to great advantage in the chronic form of the disease, they must be regarded as unsafe remedies unless the kidneys be perfectly healthy. In gouty persons, or whenever we have the slightest reason to suspect any tendency to renal disease, the use of blisters is hazardous, on account of their liability to produce irritation of the urinary organs. Probably this objection may apply less strongly to the use of liquor vesicans or of blistering-paper than to the old-fashioned blister; but it is more prudent in doubtful cases to abstain altogether from these modes of counter-irritation.

Useful, however, as medicinal agents undoubtedly are in allaying or curing attacks of bronchitis, I need not tell you that whenever the bronchial affection is even partially referable to an existing external cause, no permanent good can be effected without the removal of that cause. Amongst the working classes it is often impossible to accomplish a change of circumstances, though I have seen a few cases, such as two of those I have related to-day (Cases VII. and VIII.) in which a change of occupation has been effected and the patients have recovered surprisingly; but amongst

the higher classes of patients, whose habits can be more easily modified, much may be accomplished in that direction. I say whenever the bronchial affection is even partially referable to an external cause, because I must remind you again, that cases of simple primary bronchitis, such as most of those I have brought before you to-day, are comparatively rare. Even amongst our hospital patients external causes, in a large majority of cases, only develop or aggravate constitutional or hereditary tendencies to bronchial disease; and this naturally obtains still more among the upper classes, who are exposed to such causes only in slighter degrees.

My next lecture will be devoted to giving you examples of the much larger class of cases which I have already designated as cases of secondary bronchitis.

## LECTURE III.

*GOUTY BRONCHITIS.*

RELATIONS BETWEEN CHRONIC BRONCHITIS AND THE GOUTY DYSCRASIA—  
CO-EXISTENCE OF GOUT AND BRONCHITIS IN INDIVIDUALS—FREQUENT  
EXISTENCE OF BOTH DISEASES IN SAME FAMILIES—GOUT DISPROPOR-  
TIONATELY COMMON AMONGST BRONCHITIC PATIENTS—HABITUAL ALTER-  
NATIONS OF GOUT AND BRONCHITIS IN PERSONS SUBJECT TO BOTH  
DISEASES: SUBSIDENCE OF GOUTY SYMPTOMS FOLLOWED BY THE  
DEVELOPMENT OF BRONCHITIS: BRONCHITIS RELIEVED BY THE APPEAR-  
ANCE OF GOUT—REMARKS ON THE USE OF COLCHICUM.

GENTLEMEN,—In my lecture on the etiology of chronic bronchitis, I gave you the general results of a careful analysis of ninety-six cases of that disease, which had been under my care during the previous three months; directing your attention, especially, to the facts elicited by that analysis in reference to the various causes and complications of the bronchial affection.

I told you, moreover, as a result of that analysis, that, in a large proportion of cases, bronchitis is a secondary, not a primary disease; that is to say, a disease arising out of some other previously existing ailment or constitutional dyscrasia: adding, that long practical experience had convinced me of this fact, quite as strongly as the results of any such analysis could possibly do. I also, in that and in a subsequent



lecture, brought before you several examples of primary bronchitis, arising solely from exposure to external exciting causes, such as cold or wet, or the inhalation of dust or of unwholesome air.

I now, therefore, purpose to enter on the consideration of secondary bronchitis: but as it would, manifestly, be impossible to comprise in one lecture even the most superficial notice of the various ailments and constitutional tendencies of which bronchitis is a secondary result, I desire, to-day, to concentrate your attention more particularly upon the relations between chronic bronchitis and the gouty dyscrasia. These are shown in the remarkable fact, elicited by my analysis, that in thirty-four, or more than one-third, of our ninety-six cases of bronchitis, a distinct gouty history attached either to the patients themselves or to some of their immediate relatives.

A more minute investigation of the facts bearing on this subject will now, however, be desirable. First, then, as regards the patients themselves, I find that no less than fourteen were subject to attacks of acute regular gout as well as to bronchitis; and that in nine of these cases, gout co-existed with the bronchitis whilst the patients were under my care. Eleven others had suffered either from chronic gout attended by the formation of chalk-stones, or from what has been called rheumatic gout.

I am, indeed, aware that some of our highest authorities consider regular gout and rheumatic gout as entirely different complaints; and, no doubt, there

is a pathological distinction between them. But, clinically regarded, they are allied ailments; affecting the same tissues, and often seeming to occur in members of the same family as manifestations of a common hereditary diathesis.

In the cases of nine other patients who had not themselves shown any symptoms of gout, it was ascertained that near relatives, such as parents, brothers, or sisters, had suffered from that disease; and this number, probably, by no means represents the true proportion of such cases; for, as you will remember, the family history could not be made out in much more than half the ninety-six cases analysed. These three numbers however, fourteen, eleven, and nine, make up the thirty four cases which I mentioned as showing the intimate relation between a gouty constitution and chronic bronchitis. The evidence on this head is, I think, strengthened by the fact that, in many instances, whilst some members of the patients' families had gout, others had bronchitis, and others again suffered from both complaints. Confining myself strictly to those cases in which there had been acute regular gout, I clearly ascertained the existence of both gout and bronchitis in the families of ten of my patients. Thus, in one instance, two near blood relatives of the patient were subject to gout, and one other as well as the patient to bronchitis; in another case, three were subject to gout, and one to bronchitis; in a third family, one member had suffered from gout, and five from bron-

chitis ; and in a fourth, two from gout, and three from bronchitis. In five other of the ten families, at least one member had suffered from both gout and bronchitis ; the patient under my care being, of course, in all cases excluded from the reckoning, and no two of the cases included in my analysis having been members of the same family.

By way of illustration on this point, I will give you the family and personal history of the first and fourth of these ten patients.

CASE X.—Edwin B., aged forty-seven, portmanteau-maker, became an out-patient of the Middlesex Hospital, under my care, on December 1, 1865. His father had suffered from regular gout, and had died asthmatical at the age of sixty-three. His mother was also asthmatical. One of his brothers had had attacks of regular gout, and a sister suffered from chronic cough.

The patient himself had had several attacks of lumbago and sciatica. He had also for many years been subject, during the winter, to cough, which usually began in September or October, independently of any special cause of taking cold, and lasted until March or April. The cough was attended by much dyspnoea and by frequent attacks of difficulty of breathing at night. These paroxysms usually came on at one or two o'clock in the morning, after he had been asleep ; compelling him to sit up in bed for a longer or a shorter time.

I should tell you that such paroxysms are not, in

my experience, by any means common in chronic bronchitis. Dr. Graves indeed says, in his admirable Clinical Lectures, that he scarcely ever met with a patient who had been subject to chronic irritation of the bronchial tubes, who did not also labour under more or less of asthmatic dyspnoea. If, however, we restrict the term 'asthmatic dyspnoea,' as I think we should do, to true paroxysmal dyspnoea, such as that from which this man suffered, then it is certain that it occurs only in a small minority of even confirmed cases of chronic bronchitis. Dr. Graves more probably used the term in its popular sense, for the dyspnoea which is commonly attendant on chronic bronchitis, especially when complicated either with pulmonary emphysema or with cardiac disease; and which is only paroxysmal inasmuch as it is aggravated by every physical exertion and by every accession of catarrh.

So far as I could learn it was in this latter sense that the patient applied the term asthmatical to both his parents. At the same time asthma, like bronchitis, is often connected with a gouty diathesis, and I have no doubt that in the patient himself this diathesis was the cause of both complaints.

At the time of his admission, the patient's skin was cool; pulse 84; respirations 36 per minute. His cough was troublesome and the expectoration thin, white and frothy; but he said that it was more generally thick and of a yellow colour and had sometimes been streaked with blood. His urine was non-

albuminous. On examination his chest was broad and deep. The veins of the neck and the superficial veins of the thorax were turgid, most markedly on the left side; and the respiration was laboured. He said that he was never free from dyspnoea, even in summer, and suffered more particularly from it in hot weather. The percussion resonance was clear over the whole front of the chest, especially in the mammary regions, and the clear sound encroached somewhat on the normal cardiac dulness. Posteriorly the resonance was also clear, excepting over the base of the left lung, where it was slightly deficient. The respiration was harsh, expiration prolonged. Rhonchus was more or less audible over both lungs, and moist sounds were heard with inspiration in the base of the left lung. The heart's apex was somewhat depressed.

The patient continued under observation until February, when he was discharged almost well, as regarded the bronchitis, and without having had any symptoms of lumbago or sciatica.

CASE XI.—Susan S., aged fifty-seven, a married woman, was admitted an out-patient of the Middlesex Hospital, under my care, December 8, 1865. Her father, who had suffered much from regular gout, died at sixty-eight of bronchitis. Her mother had had rheumatic fever at the age of thirty, but had been otherwise a healthy woman. One brother had also had rheumatic fever at thirty, another had been gouty

since middle life, and two sisters were subject to winter cough.

Our patient had had rheumatic gout of six months' duration ten years before her admission; and, during the last five years, she had suffered occasionally from rheumatic pains in the limbs. She had for twelve years past experienced shortness of breath, more particularly in cold or damp weather, and had also had cough every winter. The cough was always most troublesome in the morning, after her first rising, and was attended by a copious, white, foamy expectoration. She was entirely free from cough in summer, but always had difficulty of breathing on exertion. For about four years, she had noticed occasional swelling of her legs, which was aggravated by bodily exertion or by long standing. Her face also was stiff and puffy when she awoke in the morning. The catamenia had only ceased entirely for about a year.

On admission her skin was cool; pulse 84; urine sp. gr. 1015, copiously albuminous. There was well-marked arcus senilis of both eyes. Her chest was flat in front; shoulders much rounded. The percussion resonance was perfectly clear over both the anterior and posterior surfaces of the chest. The respiration was sibilant throughout both lungs. The heart was in its normal position and the heart-sounds were free from murmur. The cough was prolonged, abortive and wheezing.

In this case you will observe that there was

albuminuria in addition to the bronchitis and gouty pains; a complication which, as I told you when dealing with the facts brought out by my analysis, is by no means an uncommon one in bronchitis of gouty origin. But I will not detain you now with explanations on this point, as I have quoted the case at present only for its etiological importance.

It is, indeed, true that the gouty form of dyscrasia is exceedingly common, not only amongst private patients, but also among the working classes, and especially among the artisans of London, who frequent our hospital out-patient rooms. But, common as it is, gout is found in a very much smaller proportion of the total number of our hospital patients than of the bronchitic class of patients taken by themselves. Hence I think myself justified in the conclusion that there is, really, the intimate relation between a gouty constitution and chronic bronchitis which I have frequently taught you; and that in many cases, in which a hereditary tendency to gout has not been developed into the characteristic form of that disease, it manifests itself in the form of chronic bronchitis.

In further support of these views, I may mention that I have frequently known bronchitis and gout habitually alternate; an obstinate attack of bronchitis sometimes subsiding on the occurrence of a smart fit of gout, and again, at other times, a fit of gout being relieved by the development of bronchitis. I well recollect a striking example of this alternation in the

case of an elderly man who was long under my care. His ailments were gout, psoriasis, and bronchitis, and he was rarely or never free from all of them. No two of the three ailments ever co-existed in his case ; but it would happen that just as he was congratulating himself on having got rid of the gout, his skin would become covered with psoriasis, and this in a few weeks would take its departure, and be succeeded by an attack of bronchitis.

I have dwelt at considerable length upon this, as I am convinced, very frequent constitutional origin of bronchitis, because its recognition affords the clue to the successful treatment of the disease in many cases ; and, although it has been mentioned in express terms by Sir Henry Holland and several other eminent physicians, it has never, I think, been so prominently or specifically brought forward, as to secure for it, in ordinary medical practice, the attention its importance deserves. I shall now proceed further to illustrate my remarks on this subject by reading to you several instructive cases ; which I have selected, mostly, from among those of the cases included in my analysis, in which no family history could be obtained, and the gouty diathesis was ascertained exclusively from the patient's symptoms and personal history.

The first case is that of a man who was only a short time under observation, but I have chosen it as affording a more than usually obvious illustration of the relation between gout and bronchitis in an individual patient. In the greater number of cases



the secondary character of bronchitis is to be inferred rather from the history of the case or of the patient's family than from present facts patent to the observer; and I have hitherto endeavoured to make the relation between gout and bronchitis apparent to you, chiefly by showing the large proportion of bronchitic patients in whom, or in whose families, I have found a more or less definite history of gout.

In many cases, no doubt, the gouty dyscrasia only produces a strong predisposition to bronchitis, and the disease is first developed by some external exciting cause; though, frequently, by a much slighter one than would be likely to produce the same effect in a healthy subject. In other cases, again, we find in gouty constitutions a certain degree of chronic bronchial irritation, manifested by more or less constant scanty expectoration, which either merges slowly and almost imperceptibly, as life advances, into chronic bronchitis, or is more rapidly developed into it by exposure to vicissitudes of temperature or other immediate exciting causes.

In the case I am about to relate, however, the patient had not only himself suffered from definite attacks of both gout and bronchitis, but he did not refer his bronchial symptoms to any exposure, and considered them merely as the sequelæ of the gouty attacks, which they immediately followed and appeared to supersede. This, in fact, occurred, as the following brief history will show, on occasion of the attack for which he came under my care.

CASE XII.—Henry T., aged forty-eight, a pallid sallow-complexioned man, by occupation a tailor, was admitted an out-patient of the Middlesex Hospital, under my care, on January 12, 1866. He stated that he had for several years suffered from occasional attacks of regular gout, always commencing in the ball of the great toe. After the gout he had also been subject to what he called asthmatical attacks, and during the previous winter had suffered for some time from cough. Somewhat more than a fortnight before presenting himself at the hospital, he had been attacked by gouty pains in the knee, foot, and left elbow, accompanied by severe headache. In the course of a few days these pains had entirely subsided except in the elbow; and, simultaneously with their disappearance, he had begun to suffer from cough and dyspnœa.

On admission, he complained much of the dyspnœa, especially on first rising in the morning and on moving about, and said that the cough was attended by a copious, thick, white expectoration. The left elbow was still hot, swollen, and tender; the skin was moderately warm; pulse 90; urine normal. The chest was everywhere resonant on percussion, indeed abnormally so in both mammary regions, and posteriorly over the lower lobe of the left lung; the respiration was slightly laborious; the expiration prolonged; and loud cooing sounds were audible over both lungs. The cardiac sounds were free from murmur, but the

area of cardiac dulness was increased, and the heart's impulse was more diffused than in the state of health.

I gave the patient at first the compound squill draught during the day, and a pill, consisting of two grains of the acetic extract of colchicum and three of Dover's powder, each night at bed-time. Under this treatment he rapidly improved; the gouty symptoms in the elbow disappeared almost immediately, and the cough and expectoration soon greatly abated. He still, however, suffered from dyspnoea; and, as there is emphysema in both lungs, he will probably continue to do so, more or less, as long as he lives.

The next case I shall read to you is that of a man who was a patient of mine at intervals for more than three years; and in whom, as you will see, the bronchitis, which at first alternated with the gout, ultimately superseded it.

CASE XIII.—Edward G., aged forty, groom, was admitted an out-patient of the Middlesex Hospital, under my care, on January 14, 1863. He was suffering from regular gout attended by slight bronchitis, which became more severe as the gout subsided. The bronchial attack was very tedious, being aggravated by every exposure incidental to his occupation. In April he had another attack of acute gout in the feet, probably brought on by his continuing to drink beer freely, and he then lost the bronchitis.

He was re-admitted late in the autumn for an

attack of bronchitis without any gouty symptoms. He had taken cold, and the attack had begun with nasal catarrh and sore throat. His voice was hoarse; skin cool; pulse 75; urine normal. The chest was resonant on percussion; and, with the exception of rhonchus in the lower and posterior parts of both lungs, the breath-sounds were normal.

From that time he lived more carefully and had no returns of regular gout whilst under my care; though he suffered occasionally from pains in the knuckles. He had, however, attacks of bronchitis once or twice annually; and, considering the exposure inevitable in his line of life and his obviously confirmed tendency to the disease, a complete cure was scarcely to be expected.

I shall now relate two or three other cases, in which the gouty diathesis was manifested in some form of irregular gout, or gouty neuralgia; which alternated with the bronchitis in the same manner as we have seen in the cases of regular gout.

CASE XIV.—Hugh T., aged thirty-four, pianoforte-maker, became an out-patient of the Middlesex Hospital, under my care, February 12, 1866. He had then been ailing a year; during which time he had suffered alternately from cough and from what he called rheumatic pains in the knees and elbows. At the time of his admission he had slight cough and dyspnoea, but he presented himself at the hospital on

account of gastralgia of some weeks' standing. The pain came on soon after eating, and was excessively severe.

This gastralgia, I may observe, was but a different manifestation of the same disorder of health which induced the bronchitis and the so-called rheumatic pains. This form of dyspepsia is very common in persons of gouty diathesis, who have never had paroxysms of acute gout; and, like other irregular forms of the disease, may either be relieved by a fit of regular gout, or may give place, as you will see it did in the present case, to some new train of irregular gouty symptoms.

On this occasion the patient was soon relieved from his ailments by the use of bismuth and magnesia in combination with a bitter infusion and of small doses of blue pill, rhubarb and ipecacuanha; but he returned on May 27 with pain and excessive tenderness in the toes and soles of the feet and with lepra on the arms and legs. He said that he had of late suffered but very rarely from gastralgia and then only in a slight degree, neither had he any cough, but he was not free from dyspnoea. He was treated with iodide of potassium, ammonia and colchicum; to which, as the pains abated, small doses of arsenic were added.

On July 22 the pains had for some time entirely left him, and the eruption was gradually disappearing; but he had again begun to cough and expectorate, and complained of increased shortness of breath.

The chest was normally resonant, but harsh rhonchus was audible throughout both lungs. He was ordered small doses of hydrochloric solution of arsenic and diluted hydrochloric acid, with cod-liver oil, and a sedative pill at night to allay the cough. He was soon relieved and ceased to attend.

Late in October he again came under treatment for lumbago and pains in the knees and elbows, having then no cough; but the lepra, which had never altogether left him, was much increased. As these ailments yielded after a six weeks' course of treatment he once more began to cough, and suffered from chronic bronchitis throughout the winter.

On April 20, 1867, he was quite free from lepra and gouty pains, and had only a little cough and expectoration on first rising in the morning. He was put upon a course of nitro-hydrochloric acid and tincture of larch, and was discharged quite well early in June.

The next case is almost precisely similar in character to the one just quoted, though it was under observation for too short a time to exhibit the same remarkable succession of alternations.

CASE XV.—Roger C., aged thirty-one, a pallid unhealthy-looking man, a cabinet-maker by trade, was admitted an out-patient of the Middlesex Hospital, under my care, in October 1865. His family history was not unsatisfactory: but the patient himself had

several times, during the last five years, suffered from lumbago and sciatica ; and he had also, occasionally, had pain and swelling of the feet. He had been in the habit of drinking beer largely.

At the time of his admission he had sciatica of the left thigh, extending down to the calf of the leg. His skin was cool ; pulse 76, rather feeble. In view of the man's anæmic aspect, I ordered him to take half a fluid drachm of syrup of iodide of iron, with two grains of iodide of potassium, three times a day, and a pill at bed-time, containing two grains of acetic extract of colchicum, and three grains of Dover's powder.

The pain began to abate almost immediately, and at the end of a fortnight, when it had nearly subsided, a regular attack of bronchitis came on, which lasted many weeks, and was not fully relieved when the patient discontinued his attendance.

I should not omit to mention, that, when his chest was examined, a few patches of psoriasis were found on its anterior aspect.

The last case I shall read you, of this character, is that of a woman who has been under my care, at intervals, during the past twelvemonth.

CASE XVI.—Mary Anne F., aged fifty, a domestic servant, became an out-patient of the Middlesex Hospital, under my care, on April 20, 1865, for chronic bronchitis. On admission she stated that

her father had died of asthma, in middle life, and that she had herself, for many years, been subject to cough in winter and spring; more particularly since the cessation of the catamenia at the age of forty-three. She suffered also from palpitation and from shortness of breath on exertion; and, when she took cold, she had often such difficulty of breathing as to prevent her from lying down in bed. She had, likewise, on several occasions, been attacked by lumbago or sciatica.

On the setting in of fine weather, her cough subsided, and she did not re-appear at the hospital until September 15; when she was re-admitted for a severe attack of lumbago, accompanied by shooting pains in the hands, with tenderness and slight swelling of several of the knuckles.

The pains were soon relieved by treatment with iodide of potassium, carbonate of ammonia, and small doses of wine of colchicum; but they had not entirely subsided, when, on October 6, the patient began to complain of cough. On that day I examined her chest, and found it normally resonant. The respiration was dry and harsh, and the sound of expiration audible and prolonged throughout both lungs. She was ordered five grains of the compound pill of hemlock at bed-time, in addition to the draught she was taking during the day.

On October 20 she had been entirely free from pains for more than a week, but her cough was very troublesome, and the expectoration frothy and



copious. Rhonchus was heard in the bases of both lungs posteriorly; and also, on deep inspiration, in the upper lobe of the right lung. Faint crepitation was occasionally heard in the lower lobe of the left lung. She was now treated more specially for the bronchitis, and took the compound senega draught, with twenty minims of tincture of henbane, during the day, and a pill of Dover's powder and acetic extract of colchicum at night.

She continued this treatment for some time with very good effect; but her case, like most of those I have seen in which bronchitis has alternated with gouty ailments, proved very tedious. She had fresh accessions of cough repeatedly during the winter, with and without special causes of taking cold, but she exhibited no renewal of her gouty symptoms and ceased her attendance in the early warm weather.

I have already told you that, when bronchitis occurs in persons of gouty diathesis, it frequently happens, on the one hand, that bronchitis makes its appearance on the subsidence of the gouty symptoms; and again, on the other hand, that a fit of the gout entirely relieves the bronchitis. All the last five cases I have read to you belong to the former of these two categories; and I shall now give you the history of two other cases which exemplify the latter, and not less common, mode of alternation.

CASE XVII.—Alfred B., aged forty-nine, house-

painter, was admitted an out-patient of the Middlesex Hospital, under my care, November 3, 1865. He was a tall stout man, with a broad capacious chest. His family history showed a strong tendency to bronchial affections, and also a gouty taint: his father, mother, and brother having died, he said of asthma, which evidently meant chronic bronchitis and its consequences; whilst two living brothers suffered from the same disease, and another from gout. He himself had frequently had gout, most commonly in the knees, but also in the toes, wrists, and elbows. He said that he was a moderate man, drinking nothing but beer, and not more than two or three pints a day. He had been subject to chronic cough in winter for seven or eight years, and was very liable to take cold even in summer; but he did not attribute his ailments to any special exposure.

On admission he was suffering from dyspnoea and cough attended by a scanty, thick, white expectoration. His face was puffy, tongue fairly clean, pulse 90. The chest rose evenly in respiration, and was equally and normally resonant on percussion on the two sides. The respiration was slightly laborious. The breath sounds were normal over the upper and anterior parts of both lungs, but mucous crepitation was audible in the lowest part of the right lung. Posteriorly, the percussion resonance was perfectly normal over the bases of both lungs; but cooing rhonchus, intermixed with moist crepitation, was heard from the base upwards, as high as the angle of the scapula

on both sides. The heart-sounds were normal in character and position. The urine was high-coloured, acid, and contained no albumen. I prescribed the compound squill draught of our hospital Pharmacopœia, with twenty minims of tincture of henbane, to be taken every six hours ; and a night-pill containing one grain each of blue pill and ipecacuanha powder, with three grains of powdered rhubarb.

At the end of a week he was very much better, and the report in the case-book on November 14 is that the cough was much diminished and the expectoration had become more scanty. The breath-sounds had become normal, with the exception of slight sibilus and scanty mucous clicking in the bases of both lungs. But at this time gouty symptoms were making their appearance, and in a few days a regular fit of gout came on, during which the cough entirely disappeared.

This is, in brief, the history of a mild case of gouty bronchitis, in which the bronchial affection was evidently relieved by the occurrence of the gouty paroxysm. The case was comparatively so slight a one, and the patient when he first came under my care was so entirely free from any gouty symptoms, that I did not then deem it necessary to resort to any specific treatment for the constitutional disorder. I have therefore read it to you, not with reference to that branch of the subject, but merely as another illustration of the intimate relation between gout and

chronic bronchitis; which was shown in this case not only by the alternation of the two diseases in the individual patient, but also by the appearance of one or other of them in so many members of his family.

The second case is one which I have had the opportunity of watching at intervals during a long period, and which is still under observation.

CASE XVIII.—George S., aged fifty-nine, married, a hat-maker by trade, first became an out-patient of the Middlesex Hospital, under my care, on October 23, 1864. He then stated that he had for many years been subject to cough and expectoration with dyspnœa: in summer as well as in winter; as much in hot as in cold weather. A medium temperature suited him best, extremes in either direction always increasing his ailments. He had had regular gout for the first time twenty years before, and said that he was in the habit of suffering from gouty pains in the hands and feet; but he was free from them at the time of his admission. He was also subject to occasional psoriasis.

On enquiry he admitted that he was a confirmed beer-drinker; though, in his own opinion, a moderate one. What he considered moderation was, however, in all probability, excess; for many years' observation has led me to the conclusion, in common with the late Dr. Todd, that to no circumstance is the prevalence of gout among our London artisans more attributable,

than to their large habitual consumption of malt liquor.

The patient himself referred his complaints to exposure to vicissitudes of temperature during his work ; but, the appearance of the gout having preceded that of the bronchial affection, and the bronchitis having been accompanied or followed by gout in three out of the four attacks I have witnessed, we may reasonably assume that these vicissitudes were, at most, only the immediate exciting causes of irritation in a bronchial membrane already predisposed to disease by existing constitutional derangement.

When admitted, George S. was suffering from a pretty severe attack of bronchitis, attended by much dyspnoea and by a copious frothy expectoration ; but he said that although he was never altogether free from expectoration, any more than from cough, it consisted only, during the intervals between the more acute attacks, of a small quantity of thick, transparent, bluish mucus.

Now this is the exact counterpart of what we meet with every day in bronchitic patients, more particularly in those who have also a gouty constitution. They habitually raise in the early morning, and it may be also at rare intervals during the day, little pellets of tenacious bluish, starch-like mucus, sometimes studded with darker specks. This ailment, which may perhaps be almost too slight to attract the patient's attention, is quite compatible with good health in all other respects ; but it is nevertheless

the proof of an abnormal condition of the bronchial membrane. In the healthy state, only just as much fluid is secreted as is necessary to keep the bronchial membrane soft and moist enough for the due performance of the function of respiration. We may therefore safely assume, as a rule, that wherever there is expectoration, however small in quantity, the membrane is not in a perfectly healthy state; and is, consequently, far more liable than a membrane in the normal condition to suffer from any immediate exciting causes of bronchitis, of whatever kind.

To return to the patient, however, I should tell you that he was treated successively with our compound senega draught and with nitro-muriatic acid in combination with tincture of gentian, ipecacuanha wine, and tincture of henbane. On December 11 he was in all respects greatly improved and was discharged, comparatively well, on January 16, 1865. He was readmitted on May 6 of the same year, suffering from gout in the fingers of the right hand, and also from cough, attended by the white, frothy, mucous expectoration characteristic of recent bronchitis. There was now, also, slight œdema of the ankles; but the urine was free from albumen. The chest was found on examination to be normally resonant on percussion; sibilus and rhonchus were more or less audible throughout both lungs; the expiration sound was prolonged, especially in the upper lobes; and mucous crepitation was heard in the base of the right lung.

Taking into consideration the mixed character of the illness—showing the actual co-existence of gout and bronchitis—I prescribed a combination of medicines calculated to meet both aspects of the case; that is to say, I gave four grains each of iodide of potassium and carbonate of ammonia, ten minims of wine of colchicum, and twenty minims each of the tinctures of squill and henbane in an ounce and a half of camphor water, three times a day; together with five grains of the compound pill of hemlock every night.

This is a plan of treatment which, modified according to circumstances, I have often found very serviceable in similar cases, and under its use George S. gradually improved; but, at the end of a fortnight, his appearance being anæmic, a grain of sulphate of iron was substituted for the ammonia in the draught. The gout soon disappeared; but the mucous crepitation in the base of the lung still continuing without change, I ordered a draught containing twenty minims each of tincture of perchloride of iron and tincture of henbane, with ten minims each of ipecacuanha wine and diluted hydrochloric acid, in peppermint water, to be taken three times a day. My patient now recovered rapidly; but continued under occasional observation till the month of August.

He did not present himself again until May 5, 1866, when, curiously enough, at the exact interval of one year from the date of his previous admission, he was readmitted under my care in an almost identical condition. The finger-joints were again swollen and

painful, and he was suffering in the same manner from cough and dyspnœa. The bronchitis, however, was in a more advanced and chronic state; the expectoration being now thick, opaque, and muco-purulent, instead of glairy and frothy as on his previous admission.

He was treated in a similar manner, but improved more slowly than the year before. The cough varied from time to time; but, though better on the whole, was by no means gone, when, towards the end of June, with the accession of hot weather, he was attacked by gout in a more pronounced and regular form, affecting successively the balls of both great toes, the ankles and fingers. On the appearance of gout in this acute form, the cough and expectoration at once abated; and I then ordered him a draught containing one grain of sulphate of iron, five grains of iodide of potassium, fifteen minims of wine of colchicum, and one drachm of glycerine in peppermint water, three times a day; with a pill at night consisting of two grains of acetic extract of colchicum and three of Dover's powder. He continued this treatment, with some modifications, for a month, and was discharged quite well on August 4.

The relief, however, on this occasion was not of long duration, for on December 5 he applied for re-admission. His cough had returned, with much wheezing and dyspnœa, and with the frothy, transparent expectoration I have described as characteristic of recent bronchitis. His skin was cool, pulse 90, but quite regular. The sides of the chest rose evenly



in respiration, and were equally and normally resonant on percussion. The heart sounds were normal. Rhonchus and sibilus were audible over the lower lobes of both lungs posteriorly, intermixed with faint mucous crepitation in the base of the left lung. The urine was normal. At this time he was quite free from gouty pains and I ordered him our compound squill draught, with twenty minims of tincture of henbane every six hours; but, bearing in mind his gouty tendencies, I added the night-pill of colchicum and Dover's powder which he had taken the year before.

He soon improved greatly as regards the cough, and the expectoration diminished and became opaque and of a bluish colour; but the subsidence of the bronchial affection was again simultaneous with the development of gout, though of a less acute character than on the last occasion: this difference being possibly due to the specific treatment the patient had been undergoing before its appearance. In addition to the night-pill he again took the iodide of potassium, with ammonia and colchicum wine, and has recently discontinued his attendance, being then quite free from both gout and bronchitis.

You will observe, in this case, that the interval between the two last attacks was shorter than that between the earlier ones. This is very apt to be the case in gouty affections, the attacks of which usually tend to become both more frequent and more obstinate on each successive recurrence.

It is indeed, supposed by some physicians that the use of colchicum as a remedy for gout, although it mitigates and shortens the existing paroxysm, indirectly favours the increasing frequency and severity of the attacks; and, by these authorities, the shorter interval between the later attacks in this patient's case would probably be set down to the employment of that drug. In this view, however, I by no means concur. I have found colchicum a most valuable remedy in the treatment of gout, provided that it be administered in small doses and persisted in for a sufficient length of time; and provided, also, that the diet and habits of the patient be properly regulated, not only during the actual attacks of gout, but also during the intervals of comparative health.

It is, however, peculiarly difficult to regulate the habits of hospital out-patients; and I strongly incline to believe that this man, although he strictly followed my directions as to medicine, generally disregarded my injunctions as to diet and abstinence from malt liquor. Moreover, he continued to work at his occupation as long as possible before laying up, and resumed work again as soon as possible after an attack of illness. He was never, therefore, for more than a short time exempt from the exposure to vicissitudes of temperature, which no doubt tended, more or less, to excite the frequent exacerbations of his bronchitic symptoms, although not, in my opinion, the original or even the principal cause of them.

## LECTURE IV.

*GOUTY BRONCHITIS.*

FREQUENT ASSOCIATION OF PSORIASIS AND ECZEMA WITH BRONCHITIS—RELATIONS OF PSORIASIS AND ECZEMA WITH GOUT: ALTERNATION OR CO-EXISTENCE WITH REGULAR GOUT: PREVALENCE IN GOUTY FAMILIES—ALTERNATIONS OF GOUT, PSORIASIS AND BRONCHITIS—ALBUMINURIA ASSOCIATED WITH BRONCHITIS AND GOUT: BRONCHITIS WITH GOUTY KIDNEYS—ASSOCIATION OF GRAVEL WITH BRONCHITIS: ALTERNATIONS OF GRAVEL, PSORIASIS AND BRONCHITIS: OF STONE, GOUT AND BRONCHITIS—TREATMENT OF GOUTY BRONCHITIS.

GENTLEMEN,—You cannot fail to remember that I have often pointed out to you certain cutaneous affections, and more particularly psoriasis and eczema, as being of common occurrence in persons of gouty constitution. According to my view, therefore, that chronic bronchitis is frequently due to this same constitution, it is by no means surprising to find, as we did in the last lecture, that psoriasis was associated with the bronchitis in several of the patients whose cases formed the subjects of comment.

The association of psoriasis and eczema with bronchitis and gout was shown, also, in the results of the analysis of cases which I gave you in my lecture on the etiology of chronic bronchitis. One or other of these cutaneous diseases was present in

eleven of the cases comprised in that analysis, during the time that the patients were under my care for bronchitis; and, of these eleven patients, eight were subject to regular or rheumatic gout in their own persons.

But whilst these eruptive diseases often occur in persons of evidently gouty habit, they are also not unfrequently present where there is no other evidence of a gouty tendency in the patient's personal history; and, sometimes, are even found, though I think but rarely unless they are of syphilitic origin, where there is no evidence of gout in the history of the patient's family.

Thus, in the remaining three of the eleven cases just mentioned, the patients had shown no regular gouty symptoms: and, again, in three other cases included in my analysis, the patients described skin-diseases, clearly of eczematous character and certainly not of syphilitic origin, to which they were occasionally subject; though they had neither themselves suffered from gout, nor were aware of its existence in any member of their respective families.

It is, however, often difficult to obtain, from hospital patients, full or accurate information on such points of family history, especially with reference to diseases from which they have not suffered in their own persons; whereas, in the higher classes of society, similar cases frequently come under my observation, in which the patient's ailments can be referred to the gouty diathesis inherited from a

parent, or grand-parent, and the common constitutional taint can be traced, in various forms, in many of their descendants.

The following are examples of such family inheritance.

A patient of mine, a gentleman aged fifty-five, who lives an active, out-door, country life, being master of the hounds in his neighbourhood and also a keen sportsman with the gun, has suffered for many years from most intractable eczema; which has never been more than temporarily relieved by medical treatment. This has, no doubt, been partly due to the impossibility of inducing him to conform to a regular regimen; but partly also, in my opinion, to his having inherited a gouty diathesis from his father, a free liver of the old school, who had been what his son called 'a martyr to the gout.'

A year ago I was consulted for a young lady who had eczema of the scalp, invading the forehead. At the present time I am attending her mother, aged forty-nine, for much more severe eczema, affecting especially the axillæ and groins. Neither of these ladies is gouty, but the mother's father suffered from gout.

I have also recently attended a gentleman, aged fifty, of regular and temperate habits, who is much troubled with eczema of the hands and other ailments which I attributed to a gouty constitution. On enquiry I ascertained that a brother suffers from gout and a sister from bronchitis attended by asthma.

In another family, several members of which have been patients of mine, the grandfather of the present generation suffered from gout. Amongst his children, the eldest son had, in middle life, acute gout, which has been superseded in old age by chronic bronchitis. The second son suffered from regular gout, and one daughter from rheumatic gout, affecting chiefly the hands. The youngest daughter has, for many years, suffered at times from severe eczema on the trunk and limbs, as do also two of her sons, in one of whom the skin affection shows a decided tendency to alternate with mild chronic bronchitis and gouty dyspepsia.

I shall now give you, briefly, the history of three hospital cases, in which psoriasis or eczema co-existed with bronchitis without any history of gout; but in which, from the character of the bronchitic symptoms and the tendency to alternation of the two ailments, I have no doubt that the bronchial and cutaneous affections were both due to a common constitutional cause.

CASE XIX.—Mary A., aged forty-nine, a married woman, was admitted an out-patient of the Middlesex Hospital, under my care, in March 1866. She was then suffering from slight cough, but sought relief on account of eczema, which was extensively distributed in patches over her trunk and limbs. She had suffered from sciatica, and from what she called rheu-

matic pains in the hands, which had left the knuckles enlarged. Both her parents were living at an advanced age, but she said that her father was a great sufferer, both from 'rheumatics' and cough. On that occasion she was soon relieved both from the cough and skin-affection, and remained well until the autumn.

On November 3 she again presented herself at the hospital. She was then suffering chiefly from bronchitis, but had also several patches of eczema on her chest, arms and hands. Her illness had begun three weeks before, with cough and pains in the limbs. Her skin was cool; pulse 78; respirations 24; urine normal. The expectoration consisted of a frothy mucus. She complained of shortness of breath on exertion. The respiration generally was harsh and sibilant, and rhonchus with slight mucous crepitation was heard in the bases of both lungs posteriorly. As soon as she was partially relieved from the bronchitis, she passed out of sight.

CASE XX.—William G., aged fifty-four, coachman, was admitted an out-patient of the Middlesex Hospital, under my care, on November 10, 1866. His father and an elder brother had both died of bronchitis, from which disease he had himself suffered for many years. He had also long been subject to an eruption on the skin, and to occasional rheumatic pains. Of these complaints, the eruption was most troublesome in spring and autumn, and the cough in winter.

At the time of his admission, there were numerous patches of psoriasis on his chest, arms, and legs. His skin was cool; pulse 72; respirations 24 in a minute. The breathing was tranquil whilst the patient was at rest, but moving about quickly brought on considerable dyspnoea. The heart was seen beating in the fifth intercostal space, from the nipple line to the xiphoid cartilage. The chest was abnormally resonant on percussion; the breath-sounds were feeble in front, harsh and sibilant in the bases of both lungs posteriorly. The expectoration was scanty, but he stated that at times it was much more copious, and had occasionally been streaked with blood. The urine was perfectly normal.

He was at first treated for the skin-disease, but the treatment was modified as the bronchitis gradually predominated. He was discharged nearly free from both complaints at the end of the following March.

CASE XXI.—Robert L., aged fifty, married, a piano-forte-maker, became an out-patient of the Middlesex Hospital, under my care, on April 27, 1866.

His parents had been healthy and long-lived. One of his brothers had died of asthma, and two sisters of apoplexy, but he was not aware that any of his family had been gouty. He had not himself had either gout or rheumatism, but he had for many years suffered more or less severely from eczema, affecting nearly the whole surface of his body. He



had been subject to cough in winter for four years, from the time that he contracted a severe cold from passing to and fro, in bitter weather, between his home and a close, hot workshop. He was laid up at that time for three weeks with cough, and difficulty of breathing. At the commencement of the winter of 1864 he had had so severe a return of these ailments, that for several nights he could not lie down in bed, but was relieved by the application to the chest of linseed meal poultices, sprinkled with oil of turpentine. During every attack he had had of catarrh, the dyspnoea had been urgent, compelling him often to stand still in the street from a sense of impending suffocation. His urine was usually clear and pale-coloured, but he had observed it deposit a copious, red sediment at the times when his difficulty of breathing had been greatest.

At the time of admission his skin was cool; pulse 84, regular; urine pale-coloured, and of low specific gravity. His cough was troublesome, and he was raising a frothy, yellowish-coloured mucus, in no great quantity. There had recently been extensive eczema, with which the skin was still rough, but no longer irritable. The chest was broad, deep, and protuberant, both in front, and over the lower lobes of both lungs posteriorly. The percussion resonance was abnormally clear over the whole front of the chest; on the left side almost masking the normal cardiac dulness, and on the right side encroaching on the dulness of the hepatic region. Posteriorly

there was also excessive resonance from apex to base of the chest. The heart was seen beating feebly in the epigastrium below the xiphoid cartilage; the heart-sounds were feeble, and free from murmur. The respiration was not particularly laborious; but the sounds of inspiration and expiration were divided by a distinct interval of time in both infra-clavicular regions. Rhonchus was heard in the bases of both lungs posteriorly, but there were no moist sounds. He soon improved as the warm weather set in, and discontinued his attendance.

On December 21 of the same year he was re-admitted for a fresh attack of bronchitis. There was no change in the physical signs, excepting that moist crepitation was now heard in the bases of both lungs. As soon as the more acute symptoms were relieved, he was put upon a course of treatment with tincture of larch added to the nitro-hydrochloric acid draught, and from this he appeared to derive very great benefit. He continued it throughout the winter, and in March (1867) said that he had but little cough or expectoration, except on first rising in the morning; and was so much less troubled by difficulty of breathing that he could go up and down stairs freely.\*

\* In October 1867, this patient again presented himself at the hospital, not however on account of bronchitis, but in order to obtain relief from the eczema; from which, indeed, he had never been free, but which had now become exceedingly irritable, especially on the face. He reported himself as having been more nearly free from cough, expectoration and dyspnoea than he had ever been since he had first suffered from

I must advert for a moment to two points in this case deserving of notice, although not bearing on our present subject of consideration. The first is the peculiar character of the patient's respiration. The sounds of inspiration and expiration, instead of merging the one into the other as they do in the normal state, were separated by a distinct pause. This not very common character of breathing is peculiar, so far as I have observed, to the advanced degree of pulmonary emphysema from which the physical signs showed this man to be suffering. The pause between the sounds is due, I have no doubt, to the diminished elasticity of the pulmonary tissue; retarding the commencement of the expiratory contraction upon the air contained in the cells at the end of inspiration. The second point is the striking degree of benefit which the patient has appeared to derive from the use of the tincture of larch, as regards both the eczema and the chest-affection. His case is only one of many in which I have found this medicine produce an excellent effect in chronic bronchitis.

With reference to the connection between the them. The physical signs, however, remained unaltered and the respiration was somewhat more laboured. He remained under treatment for the eczema for several weeks and was greatly relieved. I then, as a precautionary measure, directed him to resume his old medicine with the tincture of larch, and to continue it through the winter.

In May, 1868, he came to show himself after an interval of some weeks. He had a certain amount of chronic eczema, but had passed through even the foggy weather with comparative comfort as regarded his chest ailment, whereas he had hitherto, at such times, suffered from continual accessions of bronchial irritation.

eczema and bronchitis in this man, I may observe, that although no history of gout in his family could be obtained, yet the occasional deposit of red sediment in his urine, and the death of a brother from asthma, together with the evident tendency of the chronic eczema and bronchitis to alternate in severity, leave no doubt on my mind as to their common constitutional origin. Very possibly we might have discovered this if we could have traced back the family history for another generation.

That eczema and psoriasis are, at least for the most part, of constitutional and not of local origin, has been recognised by some of the best observers and highest authorities in the profession. Sir Thomas Watson, in his classical work on the 'Principles and Practice of Medicine,' when speaking of lepra and psoriasis as closely allied diseases, says, with respect to the former, that it is a blood disease depending upon some poison introduced from without, or more probably bred within, the body; and, with respect to both these forms of cutaneous disease, that he believes they sometimes depend upon the presence or the generation of an excess of acid in the system. This exactly accords with the opinion I have expressed concerning the frequent relation of psoriasis and eczema with a gouty constitution; for gout is undoubtedly a blood disease, dependent upon the presence of uric acid, a poison bred within the body. Moreover the existence of this relation has been pointed out in more or less positive terms, by several

medical writers, and amongst others by Sir Henry Holland and Dr. Garrod. Sir Henry Holland says in his eminently suggestive work, 'Medical Notes and Reflections,' that he has 'so often seen psoriasis prevailing in gouty families—sometimes alternating with acute attacks of that disease, sometimes suspended by them, sometimes seeming to prevent them in individuals thus disposed—that it is difficult not to assign the same morbid cause to these results;' and Dr. Garrod mentions, in his book on Gout, that several instances of skin disease in connection with gout have come under his observation, and amongst them cases of chronic eczema and psoriasis, which have either alternated with, or accompanied, regular articular gout. He also relates the case of a gentleman who a few months after the disappearance of gout was attacked by an eruption of eczema which resisted arsenical treatment, but yielded readily to remedies adapted to the cure of gouty inflammation.

I have myself seen numerous cases of this character and will read you the notes of one which has recently been under my care in the hospital.

CASE XXII.—Robert G., aged thirty-five, house-painter, was admitted into Hertford Ward on September 10, 1867. His father had been gouty and had died at the age of sixty. The patient was an habitual beer-drinker and had already had two regular fits of the gout. In the year 1865, a few months after the second of these attacks, he had been in the hospital

under my care for severe eczema of the face. He had recovered perfectly on that occasion, and now stated that he had remained free both from gout and eczema until about five weeks previous to his admission, when the eczema returned on his face and attacked also the insides of the thighs. The eczematous patches were extremely red and painful, and continually moist from the exudation of ichorous fluid.

At the time of his admission a faint blue line, indicative of lead-poisoning, was observed on the gums; the tongue was clean, bowels confined, urine sp. gr. 1015, neither albuminous nor saccharine. The pulse was quiet and both the breath and heart-sounds were normal, but the percussion resonance over the lungs was abnormally clear; and on enquiry, the patient stated that since I had seen him in 1865, he had suffered at times from cough and shortness of breath.

He was at first desired to remain in bed and placed on a milk diet. His bowels were kept freely open by a draught containing sulphate and carbonate of magnesia, and a glycerine of borax lotion was applied to the inflamed surfaces. At the end of a week, ten minims of wine of colchicum and five of Fowler's arsenical solution were added to his draught, his diet was improved and he was allowed an ounce of brandy daily. As the irritation subsided, oxide of zinc was dusted on the tender skin, and a mixture of tar and sulphur ointments was applied to the few isolated spots which continued moist. He was discharged

from the wards on October 1, but continued his attendance as an out-patient for five or six weeks longer, and was discharged perfectly well.

In describing this man's state on admission I mentioned the presence of a blue line on the gums, indicative of lead-poisoning; a circumstance which might appear to you quite irrelevant, as regarded the ailments to which I was specially directing your attention. It has, however, long been observed by physicians that persons under the influence of chronic lead-poisoning very frequently suffer from gout; a fact leading to the supposition that either lead-poisoning tends to produce gout, or that persons of gouty constitution are peculiarly liable to lead-poisoning. Dr. Garrod, who has devoted much attention to this subject, has arrived at the conclusion that impregnation with lead arrests the excretion of uric acid; and, thereby, produces a condition of blood identical with that which exists in gout.

Even on this hypothesis, the relation between the gout and eczema in this patient is equally obvious. His father was gouty and he had himself suffered twice from the disease, in its regular form, before the appearance of the eczema. The alternation of bronchitis with the eczema appears also very probable; for although the patient never had that disease whilst under my care, the evidence of pulmonary emphysema afforded by the examination of his chest confirmed the statement, which it led me to elicit, of his having

suffered occasionally from cough and dyspnoea during the time that he had been free from his other complaints.

The relation, therefore, as you will have already inferred, which I believe to subsist between chronic bronchitis and psoriasis or eczema, is that, when the bronchial and cutaneous affections exist in the same individual, they are due to one and the same constitutional cause ; and that this cause is, most frequently, a gouty condition of the system. Further, you will easily understand that I have brought this relation so prominently forward, not merely because bronchitis was associated with psoriasis or eczema in a considerable number of the patients whose cases were included in my analysis, but because I believe that the association of these diseases affords, in the absence of any syphilitic taint, strong presumptive evidence of the existence of a gouty dyscrasia giving rise to both ailments ; and may, therefore, often serve as an auxiliary guide to the diagnosis and treatment of the case. The alternative to which I have just alluded, that is to say, the occasional syphilitic origin of psoriasis in bronchitic patients, and perhaps indeed in such cases of the bronchitis also, may, as a rule, be readily ascertained from the patient's history ; and I believe it to be much rarer than the gouty origin of these diseases, on which it is my present object to fix your attention. The case of a private patient, now under my care, affords a better example than any of the cases included in my analysis of the occurrence of constitutional



psoriasis together with chronic bronchitis in a person of gouty family, but who had never himself suffered from gout; and I may therefore describe it in a few words.

CASE XXIII.—Mr. C., a gentleman, aged forty-two, consulted me first a few weeks ago, having suffered for ten years from dyspnœa and tightness of chest, and also from habitual morning cough attended by the expectoration of small masses of thick transparent mucus. These complaints had been gradually increasing from year to year, until latterly he had been more or less laid up with definite attacks of bronchitis every winter. He was always worse in cold, frosty weather; a damp, foggy atmosphere, provided it were mild, not appearing to affect him injuriously. On examination of his chest I found the physical signs of both emphysema and chronic bronchitis, and I found, also, that he was covered on the chest, shoulders, and back with psoriasis, from which he had not been entirely free at any time during the last five years. He had never himself suffered from either gout or rheumatism, but I ascertained on enquiry that two of his brothers were subject to gout in the regular form.

I will not trouble you in this case with details of the treatment I have advised, but will proceed to give you the history of a more aggravated case, in which, for the time at least, complete relief was obtained;

and which illustrates, perhaps more strikingly than any other of the cases comprised in my analysis, the intimate relations between gout, psoriasis and bronchitis, in an individual patient.

CASE XXIV.—Jane S., aged thirty-five, the wife of a publican, was admitted into Murray Ward under my care, on September 19, 1865. She was stout in figure, and had been accustomed to drink beer and porter to excess. From childhood upwards she had suffered from psoriasis, which was an hereditary ailment in her family; her sister and two maternal half-brothers being subject to it, as had been also her mother and her maternal grandfather and aunt: but, in her case, the disease had commenced at an earlier period of life than in her sister or brothers. She had always been subject to catarrh, and for several years past had suffered from occasional attacks of rheumatic gout, with œdema of the feet. During each of the last three winters she had been laid up with bronchitis.

On admission she suffered much from cough attended by a tenacious, frothy expectoration. Both the trunk and extremities were covered with psoriasis; the balls of both great toes were red, swollen, and tender, as were also the left elbow and wrist, and there was considerable œdema of the feet and legs. The pulse was 120, soft and compressible; the respirations, 24 in a minute, were jerking and laborious. The tongue was red at the edges, and coated on the

dorsum with a thick grey fur. The bowels were rather loose, and there was frequent vomiting after food. The urine was scanty and acid, had a specific gravity of 1018, and contained a large amount of albumen. The chest was everywhere resonant on percussion, and sibilus and rhonchus were audible over the posterior and lower parts of both lungs. The heart was seen beating below the xiphoid cartilage, and its impulse was diffused; the cardiac sounds were feeble and free from murmur.

At the moment of admission but little could be done for her, the tendency to vomiting and the looseness of the bowels forbidding the use alike of expectorants and of purgatives. I accordingly ordered her a light diet of milk, arrowroot, and custard pudding, allowing also, in consideration of her previous habits, a small quantity of brandy; and I gave her, in the way of medicine, a draught containing two drachms of the solution of acetate of ammonia and twenty minims of spirit of nitric ether every six hours, and five grains of the compound pill of hemlock every night. Notwithstanding the teasing character of the cough, I dared not give her any form of opiate, because I inferred from the vomiting and diarrhœa that she was threatened with uræmic poisoning; and, in such a state of the system, the use of opium would have been very hazardous, and might even have led to a speedily fatal result.

This was, as you may observe, a more than usually complicated case; for the patient was actually suffer-

ing, at the time of her admission, from bronchitis, gout, psoriasis, and albuminuria ; but various as these complications apparently were, there is no doubt in my mind that all of them were due to the same constitutional cause ; namely, a strongly developed gouty dyscrasia.

Under the simple treatment I have detailed the patient improved considerably in the course of a short time. She lost the sickness and diarrhœa, and the gout abated in severity ; but the cough continued troublesome, and the urine still contained a large quantity of albumen. In proportion, however, as the gout subsided, there was a decided aggravation of the cutaneous affection. On October 6 it is noted that the pulse had fallen to 90, but the cough remained troublesome, and the patient was raising a sputum which consisted chiefly of tenacious transparent mucus, slightly tinged and specked with blood, but which also contained an admixture of opaque, dark-coloured phlegm. The chest was everywhere normally resonant on percussion, but the respiration was sibilant and expiration prolonged, and cooing rhonchus was heard in the lower and posterior parts of both lungs. The cardiac sounds were free from murmur.

The patient being now relieved from any tendency to sickness or diarrhœa and able to take a fair quantity of nourishment, there was no longer the objection to the administration of expectorants which existed on her first admission, and I ordered her the compound

squill draught with tincture of henbane and continued the hemlock pill at night, with such good results, that, in three or four days, the cough had become much less troublesome and the expectoration had diminished in quantity. The breath-sounds had also improved; the cooing rhonchus being replaced by dry harsh respiration. The pulse remained about 90, the tongue was moist and clean, the bowels rather confined, and the psoriasis less troublesome, but she now again complained of pain in the great toes.

Two days later she had distinct gouty pains, not only in the toes, but also in the knees, wrists, thumbs and knuckles; whilst at the same time the cough and expectoration had still further subsided, and the skin had become softer and much less irritable. The urine was very acid, of specific gravity 1023, became turbid with lithates after standing to cool, and deposited with heat and nitric acid a considerable proportion of albumen. I now put her again on the acetate of ammonia draught, with the addition of twenty grains of the acetate of potash and ten minims of colchicum wine; keeping her bowels freely open by means of full doses of the compound magnesia draught every morning.

On the 16th the gout had entirely disappeared, she was nearly free both from cough and expectoration, and, except that the respiration was a little harsh and expiration still somewhat prolonged, the breath-sounds were normal. There was still, however, slight œdema of the feet, and the psoriasis had once more

become very irritable. She was ordered to have an alkaline warm bath every third day, and to take ten grains of light carbonate and fifteen of sulphate of magnesia, with ten minims of colchicum wine and five of Fowler's arsenical solution, in an ounce and a half of peppermint water, three times a day.

This is a combination which, with various modifications as regards strength, I have found exceedingly useful in cases of gouty psoriasis, in which arsenic alone frequently fails to effect a cure.

On the 20th the cough and expectoration had altogether subsided, the pulse was under 80, the bowels were rather confined, and the urine contained only a trace of albumen, but the psoriasis continued obstinate.

From this time there was no return of the other ailments, but the psoriasis was difficult to conquer, and the treatment underwent several minor changes, including the application to the eruption of a lotion containing borax and glycerine, from which she derived great advantage.

On November 20 she was discharged convalescent, and at that time had no symptoms either of bronchitis or gout; her skin was smooth and quite free from irritation, and the marks of the eruption were rapidly disappearing; but the urine never became quite normal, containing to the last a trace of albumen.

This case is an interesting and instructive one, not

only as illustrating the intimate relations between the bronchitis, gout, and psoriasis during the actual illness of the patient, but also on account of the family history attaching to it, which shows that constitutional psoriasis partakes equally with gout of a hereditary character. During the illness itself you will have observed that the first abatement of gout was accompanied by obstinacy of the bronchitis and aggravation of the cutaneous affection; that somewhat later the subsidence of the bronchial irritation and the mitigation of the psoriasis were simultaneous with a fresh outbreak of the gouty inflammation; and that, finally, on the disappearance of the gout as well as the bronchitis, when convalescence was becoming established, the psoriasis once more increased in severity, and long continued obstinate. In view of such systematic alternations of the morbid phenomena, it appears to me impossible to avoid the conclusion, that all three diseases were merely various manifestations of the same dyscrasia.

I must not omit, also, to direct your attention to the presence in this case of albuminuria; which, as I mentioned in my last lecture, co-existed with gout, or occurred in gouty constitutions, in several of the cases included in my analysis. It is true that the number of such cases was not large, but it must be remembered that this complication frequently supervenes at a later stage of disease than many of our patients had reached; and, moreover, is an ailment of which, in the nature of things, if not present at the

time of observation, I could obtain no history, as of gout or other obvious complaints.

It is certain that albuminuria is by no means an uncommon complication in cases of confirmed gout, and that it is, at least generally, due to that form of diseased kidney, to which Dr. Todd long ago gave the name of 'gouty kidney.' Very frequently, in such cases, deposits of urate of soda are found in the kidneys after death in the form of white streaks; which, on microscopical examination, are seen to consist of fine crystals, closely resembling those found in gouty deposits about the joints. In this case the urine was persistently albuminous, though the proportion of albumen varied from time to time and had greatly decreased before the patient left the hospital; but in other cases, like the following, I have observed the albuminuria to appear and disappear with the gout.

CASE XXV.—I saw quite recently Mr. B. E., a gentleman aged sixty-eight, to whom I had been called nearly two years before, on account of a severe attack of bronchitis, which yielded, about ten days after I first saw him, on the appearance of gout in the feet. His urine was at that time copiously albuminous, and, as he had been an habitual sufferer from gout, I was led to form an unfavourable prognosis of his case. He, however, recovered sufficiently to be able to resume the duties of a public appointment; and, having lived very carefully, is now in tolerable health, and



his urine quite free from albumen, though of rather low specific gravity.

The case of a patient lately under my care in the hospital so well illustrates the relation that exists between gout and chronic renal disease, that I will read it to you, although it would be foreign to my purpose to dilate upon all the points of interest it presents.

CASE XXVI.—Mary B., a married woman, aged fifty-one, was admitted into Northumberland Ward, under my care, on September 17, 1867. She came of a gouty family, and her mother had suffered from asthma. She had, at one time, drunk to excess both of beer and spirits, although, according to her husband's statement, she was now reformed. Ten years before her admission she had been laid up for three months with what was called rheumatic fever, but had undoubtedly been gout; and three years later she had had a slighter attack of a similar kind. From the time of the second attack she had frequently suffered from pains in the ankles and knees. She had also been subject to transient attacks of catarrh, and to shortness of breath on using any exertion, but had never suffered from habitual cough until the Christmas previous to her admission, since which time she had not been free from it.

On admission her hands were observed to present the deformity incidental to the complaint called by

Dr. Garrod Rheumatoid Arthritis, but more commonly known as rheumatic gout. On the wrist and knuckles of the right hand there were also several movable, roundish, hard nodules, which were evidently gouty deposits; and there was, also, one similar nodule on the pinna of the left ear. The chest was abnormally resonant on percussion over the anterior walls, excepting over the præcordium; the resonance posteriorly was also clear, excepting over the base of the right lung, where it was slightly deficient. The respiration was laboured, and the upper intercostal spaces were depressed, as if drawn inwards, during the act of inspiration. The breath-sounds were dry, harsh and sibilant; rhonchus was here and there audible in both lungs, and dry crepitation of slightly metallic tone was occasionally heard near the middle of the right scapula. The heart's impulse was feeble, and the apex was felt beating below the sixth rib in a line with the nipple. The heart-sounds were free from murmur. The liver was enlarged and extended an inch and a half below the margin of the ribs; it was exceedingly tender on pressure. The cough was frequent, prolonged and wheezing, often producing retching and vomiting; the sputum was scanty, tenacious and opaque. Pulse 80; respirations 20 in a minute; temperature in the axilla 99°. Urine copious, acid, specific gravity 1015; showing no trace of albumen, whether treated with heat or nitric acid.

For some days after admission, there was little

change in her condition, but the expectoration, which at first had been small in quantity, soon increased and became muco-purulent and somewhat nummular in shape. The dry crepitation began to be heard almost persistently about the point of the right scapula, and became also faintly audible at the right nipple. Her pulse on one or two occasions rose to 94, and the temperature varied between  $99^{\circ}$  and  $100.3^{\circ}$ . The urine continued free from albumen; its specific gravity ranged from 1012 to 1017.

On September 29, moist crepitation was heard in the base of the right lung, and the patient complained of a sense of sinking and of pain in the sternal region.

There was again little variation in her state until October 13, on which day I observed that her manner was strange and absent, and that she appeared to answer questions with reluctance. In the night she became maniacal, and, next day, would neither show her tongue nor answer when spoken to; and evidently had no idea where she was. Her skin was covered with profuse perspiration. She had retention of urine which, when withdrawn by the catheter, was found, for the first time, to contain a small proportion of albumen. Her tongue was clean, appetite ravenous, pulse 108. Two days later she regained her consciousness, but had an anxious, abstracted look, and said that she was lost. She answered questions slowly, and not always pertinently. The urine now had a specific gravity of 1025, deposited a

copious sediment of lithates, and continued slightly albuminous.

On October 19 her face was flushed and frequently distorted by convulsive twitchings, her speech thick and incoherent, and her pupils dilated. She died rather suddenly at 6 P.M. on the 20th.

At the post-mortem examination much fat was found on the trunk, but the limbs were emaciated. The substance of the brain was pale and anæmic, and there was much fluid beneath the arachnoid. On microscopical examination of portions of the pia mater from the upper part of the spinal chord, the walls of many of the small arteries appeared to be much thickened by hypertrophy of their muscular coat. This appearance was not found in portions of pia mater taken from the surface of the brain. The right lung was everywhere attached to the parietes by firm old adhesions. The left lung was not adherent, but on its surface were scattered patches of miliary granules. In the upper part of the lower lobe of the right lung was a large, irregular, ragged cavity, around which, for some distance, the lung presented firm yellow infiltration. Scattered through the rest of the lung, with the exception of the apex, were yellow cheesy deposits, about the size of peas. The left lung was freely crepitant, but in the upper lobe were a few similar cheesy deposits. The anterior parts of both lungs were moderately emphysematous. The bronchial glands were enlarged and infiltrated with opaque yellow matter. The pericar-

dium contained a couple of ounces of turbid flaky fluid. The heart was slightly enlarged and covered with patches of recent granular lymph; the valves were normal. The liver was enlarged and fatty. Many of the mesenteric glands were much enlarged and converted into yellow cheesy masses. In the lower part of the ileum were a few small, yellow deposits, and one or two ulcers with thickened infiltrated edges.

The kidneys were both much contracted; their capsules were thickened and adherent, their surfaces granular and studded with small cysts. On section the cortices were found to project scarcely a line beyond the bases of the pyramids. In the pyramids were several opaque, yellowish-white, linear deposits; which, on microscopical examination, were found to consist of needle-shaped crystals, some of which were agglomerated into larger masses. Of these crystalline deposits in the kidneys I show you a very accurate microscopical sketch, for which I am indebted to Mr. King, lately one of the Resident Physicians' assistants in the hospital.

This then was a case of granular disease of the kidney, with gouty deposits in the stroma of the organ. Although, from the history of the woman's case and her anæmic aspect, I suspected the existence of this form of renal disease and examined the urine repeatedly, no albumen was found in it until the last days of life, and then only in very small

quantity, and coincidently with uræmia and pericarditis. Neither were there from first to last any dropsical symptoms; the ankles were never œdematous, nor was the face observed to be puffy. These conditions, though exceptional, are occasionally met with in advanced granular disease of the kidney. The albumen will often disappear from the urine for a time, though seldom for so long a period as in this patient; and sometimes, though I think more rarely, there is the entire absence of anasarca observed in this case.

Another ailment, frequently owing to a gouty state of the system, is sometimes found, like psoriasis, associated with bronchitis, in persons who have not themselves suffered from gout; and the fact appears to me to bear so strongly on the question of a gouty origin of chronic bronchitis, that I shall give you a brief abstract of two cases from my private practice, in which gravel—the ailment I speak of—alternated with bronchitis, and in one of the two also with psoriasis, in much the same way as the psoriasis alternated with bronchitis and gout in the case which has just been under consideration.

CASE XXVII.—About a year ago I was consulted for James L., a youth aged nineteen, who complained of severe pain in the region of the kidneys. His tongue was clean, appetite good, bowels regular; in fact, he looked and felt in perfect health, with the exception of the pain in the back. On examining

the urine, however, I found that it contained a large amount of sandy deposit. Under the microscope this sand was seen to consist of minute angular crystals of uric acid, which I have already told you is the blood-poison present in gout. Under the use of alkaline and other appropriate treatment, including a strict regimen, the urine ceased to contain any gravel, and the patient entirely lost the pain in the back ; but, after a short period of comfortable health, he returned to me suffering from a mild attack of psoriasis. This also yielded in a few weeks to treatment with arsenical solution, in combination with a large excess of potash ; but was in turn soon followed by a tedious attack of bronchitis, which was immediately referable, it is true, to some casual exposure ; but the predisposition to which, in my opinion, lay in the constitutional condition which had in the first place caused the gravel, and in the second the psoriasis. I was further confirmed in this opinion by the fact that, when I last saw the patient, at an interval after the attack of bronchitis, the gravel had reappeared in the urine, though in smaller quantity.

CASE XXVIII.—The other of the two cases to which I alluded was that of Baron T., a gentleman aged sixty, who came under my care in April 1864, for a severe attack of subacute bronchitis, to which complaint he had long been subject in the chronic form. He had not been entirely free from cough for several years, and constantly suffered much from

dyspnœa. There was a considerable degree of emphysema, and, as might be expected in such circumstances, the illness was a tedious one. When, however, at length the bronchial irritation abated, he began to pass large quantities of uric-acid gravel. He would give me at each visit four or five parcels of this gravel, containing from ten to twenty grains each. After a time he appeared to be cured of this ailment also, and to be much improved in general health; he almost entirely lost his cough, and was considerably relieved from the dyspnœa. He went abroad, and I did not see him again till June 1865, when he called on me complaining of symptoms which pointed to the probability of a stone having formed in the bladder, and this proved to be really the case. Meantime his bronchitic symptoms had remained permanently much less troublesome than for years before. The stone was successfully crushed by Sir Henry Thompson, and the patient returned to his home abroad.\*

A history very similar to this last attaches to a gentleman, of whose death at Hastings I heard a few days since.

CASE XXIX.—Mr. W. B. had been healthy until his sixty-ninth year, when he was found to have a stone in the bladder. His father had died of bronchitis and emphysema, but there was no known history

\* In November 1867 I received the announcement of his death in Germany from bronchitis, the complaint for which I had originally attended him.



of gout in the family. The stone was successfully crushed, but some time later he had an attack of lumbago, which was followed after another interval by ill-developed gout in the toe and instep. The winter after this last attack he became subject to chronic bronchitis, for which complaint he came under my care. But medical treatment could now only palliate his condition, and he died of bronchitis and its consequences at the age of seventy-five years.

You will by this time fully understand that the true relation which I believe to exist between the chronic bronchitis, on the one hand, and the gout, psoriasis, albuminuria and gravel, on the other, in all these different cases is that they all depend upon a common humoral dyscrasia; which in one case produces gout, in another gravel, in a third psoriasis, or, as in the cases which we have been considering, bronchitis co-existing or alternating with one or more of these other ailments. These cases are all, therefore, examples of one form of what I have called secondary bronchitis, that is to say, bronchitis arising out of some internal condition of the system: that internal condition being, as we have seen, the existence of the humoral dyscrasia which is recognised as the cause of gout.

Regarding the treatment of this form of secondary bronchitis, it is clear from the necessarily complicated nature of the subject that I cannot pretend to give you, especially within the limits of this lecture, any

specific directions apart from the indications you will not have failed to gather from my own treatment of several of the cases discussed. The remedies appropriate to the bronchitis and to the other affections must obviously be varied and modified from time to time, in order to meet the constantly varying conditions of different patients, or of the same patient at different times; and this it is only possible to illustrate by means of examples, which might be infinitely multiplied if time allowed. The one essential point towards the successful treatment of all such cases is that you should constantly bear in mind the presence of a constitutional cause for the local affection, and not rest satisfied with directing your efforts towards the removal or alleviation of the bronchitis, but endeavour, as far as possible, to combat the dyscrasia which is the real source of the patient's ailment.

## LECTURE V.

*PULMONARY EMPHYSEMA.*

RELATIONS OF EMPHYSEMA WITH BRONCHITIS—ETIOLOGY OF PULMONARY EMPHYSEMA—CONSTITUTIONAL CHARACTER OF EMPHYSEMA: DISEASE OFTEN HEREDITARY: OFTEN FOUND IN SEVERAL MEMBERS OF THE SAME FAMILY; OFTEN IN CONNECTION WITH GOUT OR RHEUMATIC FEVER—DEVELOPMENT OF EMPHYSEMA USUALLY PRECEDED BY LOSS OF TONE IN PULMONARY TISSUES—EMPHYSEMA OF THREE FORMS: I. CONSTITUTIONAL OR SUBSTANTIVE EMPHYSEMA; II. BRONCHITIC EMPHYSEMA; III. SENILE EMPHYSEMA—DEVELOPMENT OF SUBSTANTIVE EMPHYSEMA WITHOUT COUGH: INVARIABLE SUPERVENTION OF BRONCHITIS—INTIMATE CONNECTION OF THE GOUTY DYSCRASIA WITH SUBSTANTIVE EMPHYSEMA—COMPLICATION OF BRONCHITIS WITH EMPHYSEMA CAUSING TRICUSPID REGURGITATION, ALBUMINURIA AND ANASARCA.

GENTLEMEN,—You may remember that several of the patients to whose cases I referred in my lectures on Chronic and Gouty Bronchitis, were also the subjects of pulmonary emphysema, or dilatation of the vesicular portion of the lungs; a condition often found to exist in connection with chronic bronchitis, and to which it may stand in very various relations. It undoubtedly sometimes happens that emphysema precedes bronchitis, and has made considerable progress before the accession of the latter disease; but the presence of emphysema so strongly predisposes to the occurrence of bronchitis, that sooner or later the two diseases become associated. Again, frequently aris-

ing, as we shall see, from a common constitutional cause, they sometimes run on together without its being possible to show that either had preceded or caused the other. Lastly, emphysema appears, in other and by no means rare cases, to be a direct result of bronchitis. A lecture on Pulmonary Emphysema, therefore, forms an appropriate sequel to those I have given on Bronchitis; and will, I hope, profitably engage your attention on the present occasion.

I have said that the pathological condition called pulmonary emphysema consists in a dilatation of the vesicular portion of the lungs: and this is, in fact, as nearly as I can describe it in a few words, the true character of the disease, and that which distinguishes it from interlobular emphysema; a condition resulting from the extravasation of air into the interlobular tissue, and due in a large proportion of cases to sudden mechanical rupture of some of the air-vesicles. In pulmonary emphysema, on the contrary, the air is contained within the enlarged vesicles, and hence emphysematous portions of lung are usually of more than normal size.

If the emphysema is general or extensive, the whole volume of the lungs is increased; and, as this increase in size is due to enlarged capacity for holding air, and not to hypertrophy of the proper lung-tissue, it is obvious that, in such cases, the amount of air contained within the lungs must be materially greater than in the normal condition.

From these circumstances arise the physical signs of emphysema: namely, partial bulging, or, if the emphysema be extensive, more general enlargement of the thorax; with increased clearness of percussion resonance over the emphysematous portions of lung.

If the emphysema is very partial, it is usually secondary, both in origin and importance, to some other pulmonary lesion: if, on the other hand, it is general or extensive, it is sometimes, I am convinced, the primary disease; and is always, at the least, a very important complication of other diseases, giving rise in the course of time to very obvious symptoms, and to very serious secondary consequences.

Much ingenuity has been expended upon attempts to explain the mechanical causes of pulmonary, or, as it is frequently termed, vesicular emphysema. The distending force which operates is universally recognised to be air: but very different opinions have been entertained as to the process by which it operates; that is to say, whether it effects the distension during the act of inspiration or that of expiration. It has also been a subject of debate whether emphysema is produced in pulmonary tissue which was previously altogether healthy, or whether it be not usually preceded by some abnormal condition of the emphysematous portions of lungs. It may be well, before explaining my own views, that I should give you a brief summary of the principal opinions which have been enunciated on these points.

First, then, as to the mechanism of emphysema;

namely, whether it be produced during the act of inspiration or that of expiration. Laennec, the illustrious founder of the science of auscultation, who first accurately described pulmonary emphysema, having observed that this disease supervened almost always upon severe dry catarrh, imagined that the explanation of its mechanism was to be found in the obstructed condition of the bronchial tubes, incident to that complaint. Believing the force of inspiration to be much greater than that of expiration, he supposed that the air, which during inspiration had been able to overcome the resistance opposed to its entrance by the tumid state of the bronchial membrane or the accumulation of pearly sputa in the tubes, was unable to force the same obstacles during expiration. This air remained, consequently, imprisoned in the air-cells: distending them more and more as fresh supplies of air were introduced by succeeding inspirations; until, at length, the cell-walls yielded to the pressure and became permanently dilated.

Such was the earliest view of the mechanism of emphysema. But it has been conclusively objected to it by Louis, that whilst bronchial obstruction is usually greatest in the posterior and lower parts of the lungs, emphysema, on the contrary, attains its maximum in the anterior and upper parts. At the same time, one cannot read Laennec's chapter on emphysema of the lungs without admiration of the accuracy of the clinical observation on which it is founded; for the condition which he denominates dry

catarrh is precisely that which is found in many cases associated with emphysema, especially emphysema arising from constitutional causes.

Several more or less divergent theories have since been proposed to account for the production of emphysema during inspiration, the most complete and recent of which has been propounded by Professor Gairdner of Glasgow. After stating his opinion that the act of expiration is mechanically incapable of producing distension of the lung or of any part of it, Dr. Gairdner enunciates as his own view that emphysema is a complementary lesion, dependent upon the previous occlusion of some of the air-vesicles, and invading the remaining sound portions of lung. For its development he moreover considers that a further condition is required; namely, that of partially diminished bulk, in other words collapse or atrophy, of some portion of the lung. According to this view, emphysema is produced by the inordinate action of the expanding force of inspiration upon the free air-cells of healthy portions of lung; which obtain the space necessary for their abnormal dilatation by means of the collapse of other portions of the same lung, and which receive the air that cannot enter the occluded parts. Dr. Gairdner's theory, according to my experience, can hold good only in a limited number of cases of partial and rapidly developed emphysema, following upon certain acute pulmonary diseases; and is by no means applicable to chronic or to general emphysema.

The opposite theory of the mechanism of emphysema, which ascribes its production to the act of expiration, is of comparatively modern date. A certain degree of influence on the development of emphysema had, indeed, long been attributed to the act of coughing; but the first definite assertion that lungs become emphysematous, not during inspiration, but from the effects of expiratory pressure, seems to have been made by Mendelsohn, a German physician, in a work on the 'Mechanism of Respiration and Circulation.' In support of his opinion he adduced the circumstance that the uppermost parts of the lungs, which are confessedly the favourite seats of emphysema, are precisely those parts which are least distended during inspiration, and which can offer least resistance to the pressure of expiration.

By far the most able exponent of the expiratory theory, however, is Sir William Jenner, who joins issue with Dr. Gairdner upon his assertion that the expiratory act is incapable of producing distension of any part of the lung, on account of the uniform pressure exerted, during expiration, by the external parietes of the thorax over the whole pulmonary surface. Sir William Jenner declares, on the contrary, his conviction that powerful expiration is by far the most common and efficient cause of vesicular emphysema: and shows in, I think, an unanswerable manner the inequality of pressure which must be exerted during violent expiration upon different parts of the pulmonary surface; in consequence of certain parts



of the thoracic walls being more yielding than others, and certain parts of the lungs being less firmly supported than others by neighbouring organs. He cites the undeniable fact that, whilst the powerful expiratory effort of coughing is tending to empty the lungs generally, the air is actually driven into the apices of the lungs with such force as to distend them to the utmost; and even, sometimes, to produce supra-clavicular bulging, which percussion proves to be pulmonary. And what is seen to be true of the apices of the lungs, Sir William Jenner adds, must be more or less true of all the comparatively unsupported parts which are not seen, such as the anterior margin, the margin of the base and others, which are all at the same time chosen seats of emphysema.

I entertain no doubt whatever, that, as regards the majority of cases, this theory of the mechanism of emphysema is correct, and that it is especially applicable to that large class of cases in which emphysema appears to be the direct result of bronchitis. I am, however, of opinion that emphysema may take place independently of the act of coughing, or of any violent expiratory efforts; and that, in certain constitutional conditions, the walls of the air-vesicles, being greatly deficient in tone and elasticity, gradually yield to the pressure brought to bear on them during the more or less forced respiration incidental to many ordinary occasions of daily life. Indeed, I am satisfied that any theory of the origin of chronic and extensive emphysema, which would refer it exclusively

or mainly to mere mechanical causes, is founded upon too narrow a view of the subject.

This brings me to the second, and from my point of view the more important, question ; namely, whether mechanical causes of distension usually produce emphysema in pulmonary tissue which was previously healthy, or whether its development be not usually preceded by some abnormal condition of the walls of the air-cells which become emphysematous.

This question applies chiefly to those cases in which the lungs become gradually and extensively emphysematous ; for, as I stated in referring to Dr. Gairdner's theory, partial emphysema does occasionally take place in the healthy portions of otherwise diseased lungs. Laennec, as we have seen, appears to have regarded emphysema as the result of a mechanical process, taking place in those parts of lungs which had previously been the seats of extensive dry catarrh ; but nevertheless, his accurate clinical observation compelled him to recognise that, in certain cases, the dilatation of the cells appeared to be the primary affection, and the catarrh consecutive. Dr. Gairdner emphatically states, as his opinion, that the source of emphysema is to be sought exclusively in a derangement of the mechanism of respiration, and not in any previously morbid condition of the affected part. On the other hand, Dr. Waters, the author of a recent and valuable monograph on Emphysema of the Lungs, entertains no doubt that the disease, in its severer forms, is of a constitutional

nature ; and that one of its most important features, and perhaps the primary step in it, is a mal-nutrition of the pulmonary tissue, causing its degeneration. My own opinion is even stronger on this point ; for I regard degeneration of the tissue of the lungs as being undoubtedly, in at least the large majority of cases, the primary step towards the development of general emphysema.

The best evidence as to the constitutional nature of emphysema is obviously to be obtained by inquiry into the family and personal history of the patients, in well-marked cases of the disease. Dr. Jackson of Boston, U.S., nearly forty years ago, endeavoured to show the ordinarily hereditary character of emphysema ; and, in order to arrive at trustworthy conclusions, he carefully investigated the family history of seventy-eight patients, on whose statements he could rely. Of this number, twenty-eight were suffering from pulmonary emphysema, and the remaining fifty from other diseases. He found that in eighteen out of the twenty-eight cases of emphysema, one or other of the parents of the patient had also suffered from the same disease ; and, in several instances, brothers or sisters had been similarly affected. On the other hand, out of the fifty patients who were suffering from other diseases, only three had near relatives who were the subjects of emphysema. From these facts he concluded that emphysema was a hereditary disease. To this conclusion it might perhaps be objected, with some show of reason, that,

as emphysema is often the sequel of bronchitis, and bronchitis is confessedly often a hereditary disease, it might, therefore, well be that the bronchitis itself, and not the emphysema, was the hereditary ailment in the cases analysed by Dr. Jackson. This argument would acquire force if it could be shown that emphysema occurs only as a result of bronchitis; but this, as we shall see, is certainly not the case. Moreover, I have noticed that emphysema, without any other obvious form of pulmonary ailment, is most apt to occur in persons, some of whose immediate relatives have already suffered from the same disease, and who may therefore be supposed to have acquired the tendency to it by inheritance.

One or more of such cases I shall presently read to you; but, in the meantime, I shall first place before you the general results of my own inquiries into the question of the constitutional origin of emphysema; founded upon personal investigation into a considerable number of cases, with which some of you are already well acquainted from your attendance in the out-patient room. Emphysema being one of the forms of degenerative disease incidental to old age, and its character being then somewhat different from that of the emphysema which occurs in middle life, I have excluded all senile cases from my investigation. With this exception, I have taken into account every case of general emphysema which has come under my care during the last two years, and of which I could obtain any trustworthy history. I find that the

total number of cases thus collected amounts to forty-two, and in no fewer than twenty-three of these there appears to have been a hereditary tendency to the disease. In twelve of the twenty-three cases, one or both parents were said to have been asthmatical; the term usually applied by hospital patients to the dyspnoea of bronchitis attended by emphysema. In the remaining eleven cases the disease was not restricted to parents, but was said to have existed in some other, sometimes in several other, members of the family. In one other case, a brother and sister only of the patient had suffered from emphysema, both parents and the rest of the family being healthy; but even this last case certainly points to some common constitutional condition, predisposing members of the same family to suffer from this disease.

With such facts before us, I do not see how we can avoid coming to the conclusion that the liability to suffer from emphysema is hereditary: and, when I add that twelve of these patients and many of their relatives suffered also from some form of gouty disease, and that five had at some previous period suffered from rheumatic fever, you will understand another ground for the opinion I have given, that general pulmonary emphysema is often primarily dependent upon constitutional diathesis.

Although many authorities have presumed the existence of some change in the pulmonary tissue, diminishing the tone and elasticity of the lungs, and thus predisposing them to the development of em-

physema, very few suppositions have been hazarded as to the precise nature of that change.

Mr. Rainey, indeed, found in a case of emphysema extensive fatty degeneration of the walls of the air-vesicles; weakening, and in some cases wholly destroying, their texture: and this fatty change he, therefore, conceived to be the origin of pulmonary emphysema. Sir William Jenner, again, states that the anatomical change in the lung which he has most frequently observed to result in the loss of its elasticity and contractility, is fibrous degeneration; the consequence of an exudation of lymph from capillaries, which have long been the seats of slight congestion, in persons of tolerably healthy constitution.

Dr. Waters, on the other hand, agrees neither with Mr. Rainey nor with Sir William Jenner. He states that, having carefully examined a large number of emphysematous lungs, he found, in the great majority of cases, no indication whatever of fatty matter; and he therefore cannot concur in the view of the dependence of emphysema upon fatty degeneration. Sir William Jenner's view he, as I think rightly, considers cannot apply to cases of primary emphysema, in which the degenerative process is the first step, and any congestion which may occur is only a secondary consequence; but what may be the exact nature of this degeneration, Dr. Waters adds, his own investigations do not enable him to state. Neither is any more distinct light thrown upon it by the foreign, chiefly German, authorities who hold the

same views as Dr. Waters with regard to the constitutional origin of general emphysema.

This, therefore, is the present state of professional opinion on the subject. My own observation has convinced me that fatty change is, undoubtedly, one of the forms of degeneration met with in emphysematous lungs; and that it is, in fact, more frequently found in connection with general emphysema than fibrous degeneration: but it must not be forgotten that even this view presupposes some defect of nutrition; fatty degeneration being a process which does not take place in perfectly healthy tissues.

I think there can be no doubt that the specific nature of the primary change in the tissue of the air-vesicles, which renders them prone to dilatation, must vary in different classes of cases. There is, for instance, a senile change of atrophic character, associated with emphysema in the aged; in which the lungs become shrunken, rather than over-voluminous. Again, though I believe much less frequently than is usually supposed to be the case, repeated attacks of bronchitis do, sometimes, induce the development of extensive emphysema in persons not predisposed to it by any special diathesis. I thus clinically recognise three distinct forms of general emphysema:

I. Constitutional or Substantive Emphysema;

II. Bronchitic Emphysema; and

III. Senile Emphysema;

—which last I do not at present intend to discuss. Of these, the first and most important form is that to which I specially desire to direct your attention to-day.

Constitutional or substantive emphysema is usually slow of development; and, not unfrequently, so imperceptible in its advance that it is altogether overlooked until the accession of bronchitis, or of some other pulmonary complaint, forces it into notice. In such cases, the patient gradually passes from a condition of apparent health into a state of well-marked emphysema, without the pre-existence of any obvious pulmonary disease, or of any extraordinary mechanical cause, to account for its development. The dyspnoea attendant on emphysema creeps on by slow degrees, during months, or it may be years. At first, perhaps, it is only experienced in climbing a hill, or some similar unwonted exertion; and the patient becomes so inured to its presence that he accommodates his habits of life to its encroachments, and regards it as his normal condition, until its symptoms are suddenly aggravated by the accession of bronchitis.

A patient at present under my care, whom any of you may examine for yourselves at my demonstration next Tuesday in the out-patient room, is a good example of this form of emphysema; and, in his case, as you will hear, the disease is hereditary.

CASE XXX.—Arthur S., aged twenty-five, a married man, by occupation a blacksmith, was admitted an out-patient of the Middlesex Hospital, under my care, on the 14th of June. Like many men of his craft, he was a free liver; that is to say, though not intemperate in the sense of getting intoxicated, he



was a soaker, drinking beer regularly in large quantities. Although a blacksmith, he had not been accustomed to heavy labour, his work having been always of the lighter description. His parents were both alive, as well as five brothers and sisters; but his mother had long suffered from chronic bronchitis and emphysema. About last Christmas he had begun to experience uneasiness and a feeling of tightness and oppression in the thorax, with occasional pain in the mammary regions and below the shoulders; but without any cough or expectoration. These symptoms continued to increase up to the time of his coming under my observation, when he was suffering also from occasional pain in the epigastrium, and from palpitation of the heart on making any exertion.

On exposing the chest, I found it very prominent and rounded in front, flattened at the sides, and abnormally deep in its antero-posterior diameter. The sterno-cleido-mastoid muscles were large and prominent and were engaged even in ordinary respiration; and, on the patient being desired to take a deep breath, the scalene muscles likewise were brought into action, though in a less marked degree than in many of the cases to which I have from time to time directed your notice. The heart was seen beating in the epigastrium, and its impulse was also feebly felt below the seventh rib; but it could be neither seen nor felt in the normal situation. On percussion, the thorax was abnormally resonant from apex to base on both sides; even the

normal dulness of the cardiac region being almost entirely masked by clear pulmonary resonance. The sound elicited by percussion over the back of the thorax was also everywhere clear, though less strikingly so than in front; and there was no bulging of the posterior walls, but neither was there any depression. Viewed from behind, our patient had the appearance of a strong, well-made man; but, anteriorly, there was manifest bulging of the thorax from below both clavicles to the base. The breath-sounds were feeble, but in no other respect abnormal. The heart-sounds were free from murmur; the pulse was 72, and somewhat feeble; the urine normal. The man had the aspect of fair health, and his only subject of complaint was the constant uneasiness and sense of distension and oppression in the chest.

At the time of his coming under my care he had no cough, and stated that he had had none; but, a few weeks later, in consequence, as he supposed, of taking cold, he began to cough, and raised a scanty, frothy expectoration, which was occasionally streaked with florid blood.

This, I may tell you by the way, is not an uncommon incident in pulmonary emphysema. We rarely in this disease have hæmoptysis to any considerable amount, but in many—perhaps in most—advanced cases, the sputum now and then presents streaks or specks of blood. Emphysema is usually a progressive disease; tending, moreover, to be aggravated by every cause of forcible pulmonary distension, such as

coughing, or climbing, or lifting heavy weights. The distension of the air-vesicles is of course attended by stretching of the intercellular plexuses, so that the interspaces between the blood-vessels become larger and the vessels themselves become elongated; until, at length, some of them give way. This is particularly likely to happen in the paroxysmal fits of coughing common in emphysematous bronchitis; and hence it is, most commonly, during the intercurrent attacks of bronchitis to which emphysematous patients are liable, that the slight hæmoptysis which I have described is found to occur.

To return, however, to the case before us. Our patient, after five months' treatment, is about to be discharged as convalescent. The bronchitic symptoms have disappeared, and either the uneasy sensations for which he sought relief have been mitigated, or he has become inured to them, as such patients usually do, more or less, in the course of time. Meanwhile, the physical signs remain as before, neither increased nor decreased since the accession of the bronchitis. The thorax is still abnormally resonant, and the heart is still displaced downwards and inwards by the encroachment of the over-voluminous lungs.

Here, then, is a case of unequivocal pulmonary emphysema, which was neither preceded nor accompanied by any other pulmonary lesion which could be regarded as its cause. The attack of bronchitis,

which occurred whilst the patient was under observation, supervened after the emphysema had been diagnosed ; and the history of the case clearly points to the development of the emphysema, in a great degree, between Christmas and June ; during which period the patient had, undoubtedly, been free from all other pulmonary disease. Moreover, if we may trust the patient's own report, he had never at any former time suffered from bronchitis ; and we may rest assured, at least, from his inability to recall it, that he had never suffered from any severe attack. I do not see how, in such a case, with evidence also of a hereditary tendency to the disease, we can avoid the conclusion that the real cause of the emphysema is to be sought in some constitutional vice.

It is so important that you should be fully aware that emphysema, arising thus from constitutional causes, may be developed to a considerable extent without the existence of bronchitis or of any other ailment, beyond gradually increasing dyspnoea and oppression at the chest, that I shall now proceed to read you the notes of another instructive case in point.

CASE XXXI.—John H., aged forty-two, a stoutly-built man, of medium height and robust appearance, was admitted into Founder Ward, under my care, on September 19, 1865. He had served in the navy in early life, but had of late years been a messenger. He stated that his habits were strictly temperate,

which from my personal knowledge of him I believe to have been true, and that his health had always been good. He had now, however, suffered for a considerable time from a sense of oppression at the chest and from shortness of breath, especially when making any exertion; and, on closer inquiry, I found that he had sometimes had colds with occasional slight cough. His family history showed a strong gouty tendency. His mother, indeed, was living and in good health, but his father had died at the age of fifty-three, from chronic gout and its consequences; and of a brother and three sisters who besides himself had survived infancy, his brother and elder sister were both subject to attacks of regular gout. Having previously had no complaint except the dyspnoea, he had been seized, ten days before his admission into the hospital, with rigors, vertigo, and vomiting, followed by sweating and cough. Three days later, pain had come on in the right hip, knee, and ankle, and subsequently in both feet.

On admission there was redness and œdema of both ankles and of the right hand, and general tenderness of the muscles of the right calf and thigh. The skin was hot; the tongue coated with a creamy fur; the pulse 90, of good volume and strength. The urine was amber-coloured, acid, had a specific gravity of 1026, and was non-albuminous. The chest was broad and large, prominent in front and deep at the sides. It was very resonant on percussion over the whole front; over the back of the thorax the resonance

was also clear. On auscultation, rhonchus and sibilus were heard over the upper parts of the thorax, and there was moist mucous crepitation in the bases of both lungs posteriorly. The heart-sounds were free from murmur, but the apex was somewhat depressed, and the over-lapping lungs encroached on the cardiac region so as to diminish the area of cardiac dulness.

The physical signs in this case clearly explained the cause of the dyspnœa and feeling of oppression at the chest, which had gradually come on whilst the man still regarded himself as quite well. The deep and prominent chest, the depression of the heart, and the diminished area of cardiac dulness, all pointed to an abnormal enlargement of the lungs; whilst the marked clearness of the percussion-note showed that this enlargement was due to an excess of air dilating the air-vesicles—in fact, to pulmonary emphysema. Had the increased size of the thorax arisen either from effusion of fluid, or from the escape of air, into the pleural cavity, the bulging would have been restricted to one side of the chest, the movements of which would have been unsymmetrical with those of the other side: whereas, in this case, although the expansion of the thorax was imperfect, its movements on the two sides were perfectly symmetrical. Moreover, on the first supposition, percussion would have yielded a perfectly dull note; whilst on the second, the resonance would have been tympanitic rather than, as it was, a mere exaggeration of the normal sound: and in

neither of the supposed cases would the bronchitic sounds have existed on the affected side.

The exact nature of the arthritic affection in this patient was at first difficult to determine. The pains had not commenced in any of the small joints, nor in the great toe, as is most common in gout; and they were attended by more sweating than is usual in that disease. On the other hand, the sweating was less profuse than it usually is in rheumatic fever; and the man had passed the period of life during which that disease is most apt to occur for the first time, and had attained the age about which gout very commonly begins, in persons who have a hereditary right to it. Being thus a little uncertain as to the precise character of the ailment, I, in the first place, prescribed a draught containing two drachms of solution of acetate of ammonia, one scruple of acetate of potash, fifteen minims of tincture of squill, twenty minims of tincture of henbane, and ten drachms of camphor water; to be taken every six hours. I also gave him two grains of blue pill and three of compound rhubarb pill at bedtime, and the ordinary senna draught on the following morning.

On the 22nd all doubt as to the nature of the case was set at rest by the characteristic appearance of gout in the left great toe, which was swollen and red, and so painful that the patient shrank from any approach to it. He was still perspiring, but the perspiration had not the strong sour smell belonging to rheumatic fever, and the skin was only moderately

warm. The pains in the ankle and right hand, and the bronchitic symptoms, continued troublesome. I now ordered a night-pill containing two grains of the acetic extract of colchicum and three grains of compound powder of ipecacuanha, continuing the draught as before in the daytime.

On the 26th he was still suffering severely from pain in the great toe, foot, and knee; his tongue was coated with yellow fur; bowels free; urine clear, but high-coloured and acid. The pulse had fallen to 76, and the sweating had entirely ceased; but the bronchial irritation continued, and the patient expectorated with difficulty a scanty frothy sputum. The heart-sounds were normal; there was mucous crepitation in the base of both lungs posteriorly, and sibilus and rhonchus were heard over the front and upper back of the thorax.

I now put my patient upon a plan of treatment which you have often seen me adopt with great advantage in cases of gouty bronchitis—that is to say, I prescribed for him a draught consisting of five grains each of iodide of potassium and carbonate of ammonia, fifteen minims each of tincture of squill and wine of colchicum, and twenty minims of tincture of henbane in an ounce and a half of camphor water; to be taken three times a day.

From this time very marked and rapid improvement took place. The gouty pains entirely disappeared, leaving, however, a notable amount of œdema of the left great toe, with itching and desquamation



of the cuticle. The cough and other bronchitic symptoms abated, and the patient was almost convalescent in the first week of October. He then, however, began to be troubled with psoriasis of the arms, which lasted for some weeks, for which I gave him full doses of nitro-hydrochloric acid. He was discharged on October 24, but continued to attend as an out-patient until he was cured of the psoriasis, and considered himself well. The physical signs of pulmonary emphysema of course remained, although not, so far as I could ascertain, aggravated by his recent illness; and the patient still had a certain amount of dyspnoea on exertion, which will, in all probability, increase with the advance of age.

The points in this case, to which I wish more particularly to draw your attention, are those bearing upon the diathesis, the existence of which was demonstrated by the symptoms and family history; and which I regard as having caused the primary change in the pulmonary tissue, leading to the development of emphysema.

You are already well acquainted with the relations subsisting between the gouty dyscrasia and chronic bronchitis; and you will recollect many cases, to which I have from time to time directed your attention, in which gout, bronchitis, and psoriasis have alternated or coexisted. In several of the cases upon which I founded my lectures on gouty bronchitis, emphysema was also present; but, the bronchitis

having been of comparatively long standing, there was no means of ascertaining which of the two diseases had preceded the other. In the history of the case just quoted, however, there is nothing to countenance the supposition that the emphysema had been produced by the exertion of any undue or violent force upon the inner walls of the air-vesicles ; during either the act of inspiration, or that of expiration. All the evidence, on the contrary, tends to show that some change had taken place in the pulmonary tissue itself, lessening its power of resistance to such an extent, that the walls of the air-vesicles became unable to resist the moderate augmentations of pressure, to which they were exposed in the ordinary contingencies of life.

Even if we consider that the slight catarrhal attacks, which the man had occasionally experienced, had had some influence in developing the emphysema, we can only regard them as having been able to produce such an effect, on the supposition that the lungs had previously lost their natural tone and elasticity. Upon any other supposition it would seem that, amongst persons exposed to the accidents of work and weather, the occurrence of pulmonary emphysema must be, not the exception, but the rule.

I am myself strongly of opinion that in this case, by no means a very exceptional one in my experience, the loss of tone and elasticity of the walls of the air-vesicles, which had caused them to yield to slight distending forces, was due to altered nutrition, the

result of the gouty dyscrasia. It is well known that slow degeneration of the heart is common in persons of gouty constitution, more particularly where the attacks of regular gout are either pretermitted or imperfectly developed; and the comparative frequency with which emphysema, also, occurs in persons of gouty diathesis, has long since convinced me of the existence of a similar relation between the gouty dyscrasia and some form of degeneration of the tissue of the lungs.

As I consider this view of the frequently constitutional origin of emphysema a subject of great practical importance, I shall make no apology for reading you a third case, in which it appears to me beyond question that such degeneration of the pulmonary tissue had taken place, and had occasioned the spontaneous development of emphysema.

CASE XXXII.—Walter J., aged forty-five, a carver and gilder, became an out-patient of the Middlesex Hospital, under my care, on February 23, 1866. He had suffered annually from gout during seventeen or eighteen years, and had long found himself somewhat short of breath upon exertion, but stated positively that he had never had cough until a fortnight before I saw him, when he had taken cold from getting wet-shod.

On admission, he was manifestly suffering from recent catarrh, affecting the bronchial mucous mem-

brane. He had much cough, attended by a thin, frothy, transparent expectoration, and a moderate degree of dyspnœa. His skin was warm; pulse 72; tongue coated with a creamy fur; urine non-albuminous, sp. gr. 1018. The respiration was somewhat laboured; the muscles in front of the neck being in action, even during ordinary inspiration. The chest was deep in its antero-posterior diameter, broad and well-rounded in front. Percussion elicited an abnormally clear note over the whole front of the thorax, but more particularly in the mammary regions. Posteriorly also the percussion resonance was clear. The heart was somewhat depressed, and its normal area of dulness diminished. The liver was likewise depressed; its margin being distinctly felt below the ribs. The breath-sounds were sibilant, and expiration was audible and prolonged over both lungs. Mucous crepitation was heard in the base of the left lung posteriorly. The heart-sounds were normal in character, but the impulse could neither be seen nor felt in the usual situation.

I need not, for my present purpose, detail the progress of the case under treatment. On the 15th of May the patient was discharged convalescent. His respiration was perfectly easy, and he was all but free from cough excepting in the morning, when he raised a scanty, thick, starch-like mucus, resembling the pearly sputum described by Laennec as attendant on dry catarrh.

This case was evidently one of general emphysema, for no other supposition could explain the displacement of the heart and liver and the abnormal clearness of the resonance on percussion over the whole chest. It was, at the same time, a case of emphysema so gradually developed, that it had caused the patient no inconvenience, beyond slight shortness of breath, until exposure to wet had brought on an attack of bronchitis. After one such occurrence, however, the bronchial membrane remained delicate, and a slight cause sufficed to bring on a second attack, for which the patient was readmitted under my care about two months later. The bronchitis on this occasion was complicated with anasarca and albuminuria. There was also a faint systolic murmur over the lower third of the sternum. The emphysema, which had caused so little distress while subsisting by itself, had now, when complicated with the bronchitis, so impeded the current of blood through the right side of the heart and throughout the venous system generally, as to induce both the albuminuria and the anasarca.

It might indeed be supposed probable that, as the man had so often and during so long a period suffered from gout, the kidneys had become the seats of gouty deposit, a condition which would have largely contributed to produce the albuminuria. But the comparatively normal character and specific gravity of the urine, and its uniform freedom from albumen during the patient's first attendance at the hospital,

would appear to disprove the existence of any serious change of structure in the kidneys at that time. Moreover, as the bronchitis subsided, so did also the albuminuria and anasarca, and the patient was finally discharged free from all these ailments. I believe, therefore, that both the albuminuria and anasarca were mainly, if not altogether, due to the effects produced upon the circulatory system by the bronchitis in conjunction with the emphysema.

Whenever emphysema is extensive, the obliteration of many of the capillary vessels, which causes the remarkably dry and anæmic appearance presented by emphysematous lungs, must necessarily impede the flow of blood through the pulmonary artery. This impediment excites the heart to increased efforts, and by degrees produces hypertrophy of the right ventricle, which may thus acquire just sufficient increase of power to enable it, in ordinary circumstances, to overcome the obstruction and maintain the balance of the circulation. But this compensation becomes insufficient when the obstruction due to bronchitis is suddenly added to that consequent upon the emphysema. As all obstacles to the circulation produce a backward pressure of the blood, this obstruction to the flow through the pulmonary artery tends to prevent the emptying of the right ventricle during its contraction, and throws an unwonted strain upon the tricuspid valve, which may even yield to the pressure and admit the regurgitation of blood into the auricle; thus retarding the return of blood from the venous

system to the heart. The obstruction to the venous circulation, again, causes congestive hyperæmia, more particularly of the abdominal organs ; and hence may arise albuminuria from congestion of the kidneys and anasarca from general venous congestion.

This, in fact, I believe to be the true explanation of the occurrence of the albuminuria and anasarca in the case before us ; even though some slight previous disease of the kidneys should have predisposed them to suffer from the unaccustomed impediment to the circulation : and I regard as strongly confirmatory of my view in this matter, the patient's very rapid improvement under the use of remedies which relieved the bronchitis and venous congestion, and the entire disappearance of both the albuminuria and anasarca before he discontinued his attendance at the hospital.

The systolic murmur, which I have mentioned as being audible at the time of the patient's readmission, and which also disappeared previous to his discharge, was unquestionably due to the regurgitation of blood through the tricuspid valve. Whether the regurgitation ceased altogether when the murmur disappeared must remain a subject of doubt ; for the cessation of the murmur by no means necessarily implies the absence of all reflux of blood through the auriculo-ventricular orifice : but it is quite conceivable that the regurgitation was only a temporary condition, due to the yielding of the valve to the unusual pressure caused by the distended state of the right ventricle.

The tricuspid valve is considered by some eminent

authorities to be normally so constructed, as to yield to the pressure caused by any temporary impediment to the flow of blood through the arterial orifice. John Hunter long ago remarked that the valves of the right side of the heart did not close so completely as those on the left side; but this safety-valve function of the tricuspid valve was first distinctly enunciated by Dr. Adams, of Dublin, and was very ably explained by the late Mr. T. W. King, in the second and sixth volumes of the first series of Guy's Hospital Reports. Dr. Adams looks 'upon this difference in the valves of the right and left sides of the heart as being a natural provision to allow of a partial reflux into the right auricle on those occasions when, from any cause, the passage of the blood through the arterial opening is retarded.' Such a cause existed, as I have already explained, in the case under consideration; and I have no doubt that this was precisely the condition which gave rise to the systolic murmur, the duration of which corresponded closely with the duration of the bronchitic obstruction.

In conclusion, I must briefly recapitulate those features of the case which furnish, as I conceive, very strong evidence in favour of the opinions I have expressed in this lecture. The very recent accession of the first attack of bronchitis; the certainly much older date of the emphysema, judged from the shape of the chest and from the permanent displacement of the heart and liver; the existence of gout in its



most confirmed form during a still longer time ; and lastly, the absence of any history of excessive mechanical force exerted on the walls of the air-vesicles in the course of the man's occupation or otherwise : all point out this case as a genuine instance of constitutional or substantive emphysema, intimately connected with the gouty dyscrasia which we have found to exist, also, in so large a proportion of cases of chronic bronchitis.

I would, however, by no means be understood to imply that the gouty diathesis is the only one which may cause such loss of tone and elasticity in the lungs as tends to the spontaneous development of emphysema ; for, on the contrary, I have met with cases of obviously constitutional hereditary emphysema, such as the first of the three cases related to-day, in which I have been unable to diagnose any gouty taint, or to ascertain the existence of any from the family history. The main point which I desire to impress upon you is that, in my opinion, in the large majority of cases, mechanical, or other, determining causes produce emphysema only in lungs, the tissues of which are already predisposed to yield to their action by some form of degeneration.

## LECTURE VI.

EMPHYSEMA IN CONNECTION WITH BRONCHITIS: SIMULTANEOUS DEVELOPMENT OF BRONCHITIS AND EMPHYSEMA: SUPERVENTION OF EMPHYSEMA UPON LONG STANDING BRONCHITIS—EFFECTS OF EMPHYSEMA ON THE MECHANISM OF RESPIRATION WHERE THE DIAPHRAGM IS NOT DEPRESSED—DYSPNŒA OF EMPHYSEMA CAUSED BY DIMINISHED POWER OF EXPIRATION—DEFORMITY OF THORAX ARISING FROM DEVELOPMENT OF EMPHYSEMA—PERVERSION OF THE MECHANISM OF RESPIRATION IN EMPHYSEMA WHERE THE DIAPHRAGM IS DEPRESSED.

GENTLEMEN,—In my recent lecture on Pulmonary Emphysema, I enunciated the opinion that chronic or general emphysema, as a rule, is only developed in lungs the tissues of which are already predisposed, by some form of degeneration, to yield to the distending pressure to which they are subjected. This degeneration, impairing the natural tone and elasticity of the lungs, might, I also stated, be the result of a constitutional vice, or it might be the sequel of bronchitis, or, again, it might be one of the consequences of senile decadence. I accordingly recognised three forms of general emphysema; namely, constitutional or substantive emphysema, bronchitic emphysema, and senile or atrophic emphysema. I entered fully, on that occasion, into the consideration of the first of these three forms: and the cases I then

related sufficiently exemplified the fact that, in persons of certain constitutions, emphysema may originate as a primary disease; independently of the existence of bronchitis, or of any other pulmonary lesion. Sooner or later, however, as these cases also demonstrated, bronchitis never fails to associate itself with existing emphysema.

The second of the three forms, which I propose to bring under your notice to-day, includes all that class of cases in which emphysema either begins simultaneously with bronchitis, or is developed very rapidly after its accession; and, also, all those cases in which the emphysema becomes developed only after the patient has suffered from severe and repeated attacks of chronic bronchitis.

In the cases belonging to the first class we must, I venture to think, admit, generally speaking, the fact of some previous loss of tone and elasticity in the walls of the air-vesicles; for it would otherwise be very difficult to explain the circumstance that, in some persons, bronchitis is so speedily followed by general emphysema, whilst others will suffer from severe and repeated attacks of bronchitis, and yet emphysema will be very slowly developed, and to a comparatively small extent. As both chronic bronchitis and pulmonary emphysema originate, I believe, very frequently in constitutional causes, and indeed in the same form of dyscrasia, it is quite intelligible that they should often either commence simultaneously, or that the coughing incident to bronchitis should very rapidly induce the

development of emphysema in lungs constitutionally predisposed to it. In other cases, however, there seems no doubt that repeated attacks of bronchitis may, at length, induce emphysema of the lungs without the aid of any such constitutional predisposition. And this may happen, either because the frequent and forcible distension of certain parts of the lungs, during paroxysms of coughing, has gradually impaired the tone and elasticity of the cell-walls; or because the nutrition of the pulmonary tissues has been interfered with by the bronchitis; or, as is more probable, because both these factors have acted together.

The case of a patient, who has been repeatedly under my care during the last four years, affords an excellent illustration of that class of cases in which the emphysema appears to originate in the same constitutional cause as the bronchitis; and I shall, therefore, read you my notes of it, which have been carefully preserved year by year. It is another of the very numerous examples, which have occurred in my practice, of the concurrence of gout and bronchitis in the same patient, and to which I have frequently drawn your attention.

CASE XXXIII.—William E., aged thirty-seven, a rather short, square-built man, by occupation a coachman, accustomed to drink beer daily, was admitted as an out-patient of the Middlesex Hospital, under my care, on November 24, 1864. He had been

first under my care in the year 1862 for gout, of which he had had another attack in 1863, followed by bronchitis. To each of these diseases he had a hereditary right; his father having been gouty, and both his parents, as well as one sister, having been subject to chronic cough. He had himself had slight cough in winter for several years, had had it throughout the previous winter, and had now again been suffering from it for a fortnight. The cough was attended by a copious, thick, transparent expectoration; which, he said, closely resembled starch in appearance.

On admission, his voice was hoarse, skin cool, pulse 72, and of good volume. The respirations were 22, and chiefly abdominal; the thorax expanding comparatively little in ordinary respiration, whilst the abdominal movements were very marked. His breathing was not in general much distressed, but he suffered occasionally from severe attacks of dyspnoea. His chest was broad, prominent, and very resonant on percussion over the whole front, including the cardiac region. The apex-beat of the heart was not visible. The heart-sounds were feeble and distant, but free from murmur, normal in rhythm, and best heard on the left side of the epigastrium. The sounds of respiration were feeble; but, with the exception of slight rhonchus in the base of the left lung, they were almost normal. I prescribed a draught containing twenty minims each of compound tincture of gentian and tincture of henbane, with ten minims each of diluted nitro-hydrochloric acid and ipecacuanha wine, in an

ounce and a half of water, to be taken three times a day; with five grains of the compound pill of hemlock every night at bedtime. I also directed him to discontinue drinking beer, which was likely to aggravate the bronchitis, and pretty sure to bring on a recurrence of gout.

Under this treatment my patient improved very much: and, although he continued to attend at the hospital, I may pass on to the notes of his case taken on January 26, 1865; on which day he complained of an accession of cough, attended by the same transparent, bluish expectoration which he had been raising when he came under treatment in the preceding November. He attributed, and no doubt very justly, the aggravation of his ailments to the fogs which had prevailed for some days; and he also stated that whenever he inhaled much dust, as he sometimes could not avoid doing, in the stable, he always suffered from a temporary exacerbation of his complaint. He continued under observation until the end of March, when he was discharged apparently well.

He spent the summer in the country, where he had two attacks of asthmatic dyspnoea. These came on at night, awaking him out of sleep about midnight, and the paroxysms recurred on each occasion for three or four successive nights. The difficulty of breathing was sufficient to cause orthopnoea, and the attacks were attended by cough and expectoration. He was re-admitted under my care on September 21,

having then been in London again for three weeks, and free from asthma until the night preceding his admission. This attack had manifestly been connected with an accession of bronchial catarrh; for he was coughing much and raising a scanty frothy sputum. The skin was cool but moist; the pulse 72; the respirations about 18. The front of the chest was, as before, very resonant on percussion, but the respiration was wheezy, the sound of expiration prolonged, and sibilus and rhonchus were audible over both lungs. Under treatment similar to that adopted the year before, the patient again improved, and was discharged in the course of a few weeks in comfortable health and quite free from cough and expectoration.

He continued well until the end of January 1866, when he had a fresh accession of catarrh, and again presented himself at the hospital, complaining of cough and dyspnoea in the morning, of wheezing at night, and of pain and soreness in the soles of his feet. The expectoration was transparent, thick, and rather scanty; the skin moist; the pulse 84. The respiration was somewhat laborious, and the heart's impulse was seen and felt only below the xiphoid cartilage. The percussion over the thorax was remarkably clear, more particularly over the fourth rib on either side, where also the vocal vibration was very feeble. The patient again recovered, and continued unusually well for some months, escaping altogether the asthmatic paroxysms from which he had suffered during the previous summer.

On September 8, however, he had a shivering, followed in the evening of the next day by a severe attack of dyspnoea, amounting to orthopnoea. The dyspnoea was more persistent than on former occasions, but he still became comparatively well by the middle of the day and able to do his work as usual. He had similar attacks every successive night until September 13, on which day I saw him. His pulse was quicker than in his former illnesses, being from 86 to 90, and he was expectorating with difficulty a scanty, white, frothy sputum. His breathing was more laborious than I had yet seen it, the muscles in front of the neck being now, as well as the abdominal muscles, in powerful action to assist the respiratory efforts. The sounds of respiration were somewhat harsh and dry, and expiration was prolonged.

In addition to treatment similar to that prescribed on former occasions, I now directed the patient to smoke a stramonium cigarette as soon as he felt the commencement of an asthmatic attack. He derived much relief from the stramonium, which never failed to shorten and mitigate the asthmatic paroxysms, and in a few days he was able to dispense with the cigarettes, and continued free from asthma until early in November. On the 3rd and 6th of that month he had attacks which were slighter than formerly, and did not disturb him at night, but came on when he first rose in the morning. On each occasion he smoked a cigarette, with, as he believed, very great advantage. He was desired to continue the use



of the cigarettes when required, and to take a draught containing three grains of iodide of potassium, five grains of carbonate of ammonia, and twenty minims each of the tinctures of squill and henbane, in an ounce and a half of camphor water, three times a day.

My last note of this patient is dated January 29, 1867, when he reported himself as feeling greatly better than he had done for several years past. Although it was the season during which he had been accustomed to suffer from cough, and the weather had been very severe, he had this winter remained quite free both from cough and expectoration. He had had no attack of dyspnoea since those mentioned in November. His breathing was quite comfortable excepting on foggy mornings, when he suffered slightly from shortness of breath. The physical signs of emphysema, however, remained, as before: and although the patient was quite free from subjective respiratory distress, the sterno-cleido-mastoid and scalene muscles were somewhat hypertrophied; being engaged in ordinary respiration, though not in the violent manner often seen in cases of extensive emphysema. The expansion of the chest was imperfect, but its movements were regular and symmetrical on the two sides. The abdominal muscles were in unusual activity, and so much hypertrophied that the situation of the linea alba and lineæ transversæ were distinctly marked by furrows. There was slight regurgitation of blood into the veins of the neck, but no cardiac murmur.

The heart's impulse was moderate, and the beat was faintly seen in the epigastric region.

Although I have read you only an abstract of my notes, the foregoing case has occupied much of our time, and in my opinion not unprofitably: for I believe that, apart from any points of peculiar interest in a case, more is to be learnt from the careful study of the history of one patient, during successive illnesses, than from the history of a succession of patients, each under observation for a short time only. At the same time, however, it appears to me that there are several points of especial interest in the case before us.

One of these is the pretermission of the gout, during the whole four years that the patient has been under my care for chronic bronchitis and emphysema. Since his first severe attack of bronchitis in 1863, his only threat of gout has been the pain and soreness in the soles of his feet in February, 1866. It is true that medical treatment and abstinence from malt liquor may have had some share in causing this pretermission, particularly during the latter part of the period: and, certainly, nothing is more worthy of notice than the obvious relief which the patient has derived from treatment, as regards both the frequency of the bronchitic attacks and the severity and duration of the asthmatic paroxysms. These latter are not very uncommon in emphysematous patients, and I believe are generally associated, as they were in the present case, with intercurrent accessions of bronchitis.

But, on the present occasion, I wish more especially to direct your attention to those points in the case, which relate to the emphysema and its effects upon the mechanism of respiration. I have already alluded to the very exceptional degree of comfort which this patient enjoyed, during the intervals between the bronchitic attacks, compared with most persons whom I have seen suffering from equally extensive emphysema. When last examined he declared that his breathing was quite easy, and that he was not in the least distressed at his work.

This immunity from the suffering usually incident to his condition I attribute to a feature in his case which, in my experience, is of rare occurrence in chronic general emphysema, but which was mentioned thirty years ago by Dr. Stokes in his valuable work on Diseases of the Chest. Dr. Stokes there draws a distinction between those cases of emphysema, or, as he terms it, dilatation of the air-cells, in which the diaphragm is displaced downwards, and those in which it is not so displaced; and relates the case of a young man who exhibited all the characteristic signs of emphysema, together with great enlargement of the chest, but without any evidence of depression of the diaphragm. This young man did not suffer from difficulty of breathing in the intervals during which he was free from bronchitis, and was able to take very active exercise; having, only a short time before he entered the Meath Hospital, walked a distance of forty miles in the course of a single day.

The chief inconvenience he experienced was the frequent occurrence of bronchitic attacks.

This was precisely the condition of my patient, whose case evidently belonged to the same class; for it was manifest, on inspection of his chest, that no material downward displacement of the diaphragm had been caused by the pressure of the enlarged lungs. The fulness of the epigastrium, which is observed when the heart, diaphragm, and liver are displaced downwards, did not exist; and the respiration was more abdominal than is consistent with any great interference with the position of the diaphragm. The heart, it is true, was displaced backwards and inwards, apparently by the overlapping of the enlarged lungs, and it could be seen and felt beating on the left side of the epigastrium, near the margin of the ribs. But the impulse was moderate and the pulse of good volume; showing an absence of that violent action of the heart, and also of that disproportion between the cardiac impulse and the radial pulse, which are commonly present in emphysema involving much downward displacement of the heart.

The explanation of this remarkable feature in our patient's case I believe to be, that the cartilages of the ribs, being still elastic, had allowed the parietes of the thorax to yield gradually, as the emphysema developed, to the increasing volume of the lungs; which had not, therefore, exercised upon the diaphragm more downward pressure than it was able to resist; and its normal function of enlarging the

capacity of the thorax during inspiration was, in consequence, still duly performed. To these two circumstances—the continued elasticity of the walls of the chest and the unimpaired ability of the diaphragm to do its proper work—it was doubtless due that our patient's inspiration had, at ordinary times, a much less spasmodic character than is usual in cases of extensive emphysema; the chest still expanding, though imperfectly, and the muscles of the neck being called into only moderate action as elevators of the thorax. Again, the position and action of the diaphragm being little interfered with, the abdominal muscles could be called into unusual activity to assist the performance of expiration. This they did to the extent of rendering it a visibly active process, till they had at length become hypertrophied in the manner I have described; the situations of the *linea alba* and *lineæ transversæ* being marked by deep furrows.

In fact, I apprehend that the degree of accessory aid, thus given to the act of expiration, nearly compensated at ordinary times for the loss of contractile power in the lungs; and, therefore, rendered unnecessary the painful inspiratory efforts usually made by emphysematous patients. Moreover, although the right side of the heart was undoubtedly dilated and hypertrophied, in consequence of the impeded flow of blood through the lungs, here again the increased power seemed at ordinary times just to balance the impediment. It is probable, indeed, that later in life, especially when the bony cage of the thorax eventu-

ally becomes rigid, the balance may be destroyed; for, as you are aware, the emphysematous lungs can never return to their normal condition. But, if our patient continue careful in his habits, and can escape serious bronchitic attacks, the further progress of the disease may be retarded, and the balance which seems to be now established may be long maintained, and may enable him to live on in comfort for many years.

This case, I think, clearly belongs to that class of cases in which, although the bronchitis acts as the immediate exciting cause of the emphysema, there has been some previous loss of tone and elasticity in the walls of the air-vesicles, predisposing to its development. The advanced stage of the emphysema, at the time of my first examination, showed that either it must have commenced simultaneously with the bronchitis; or that, at least, the coughing incident to the latter must have induced the development of the emphysema far more rapidly and generally than it usually does, in lungs not constitutionally predisposed to it.

I regard the case, in fact, as one in which the bronchitis and emphysema arose out of the same remote constitutional cause. After my former lecture on Pulmonary Emphysema, you will have no difficulty in inferring my opinion, that the gouty dyscrasia, which was hereditary in our patient, and which had shown itself in regular attacks of gout previous to the accession of the bronchitis, was in his case the

remote cause of the emphysema as well as of the bronchitis. On the relation subsisting between this latter disease and the gouty dyscrasia I have spoken so fully on former occasions that I need not dwell upon it now.

I shall next read you the history of a patient in whom the influence of dyscrasia is less obvious than in the case we have hitherto been considering; but in whom, also, the rapid and extreme development of the emphysema leaves no doubt, in my opinion, that the bronchitis, which had never been excessively severe, could have produced it only in lungs which had already lost their normal powers of resistance.

CASE XXXIV.—Francis M., aged twenty-seven years, a labourer, who had been under my care for a short time in December 1864, and again in March 1865, was re-admitted as an out-patient at the Middlesex Hospital, October 3, 1865. He stated that, three years before, he had been ill for nearly six months, and had been confined to bed for many weeks with rheumatic fever, followed by bronchitis. From that time he had seldom been entirely free from cough; but it had each year been less troublesome in warm weather, until the summer immediately preceding his admission, during which it had continued unabated. He had also after the first year begun to suffer from shortness of breath.

On admission, he was obviously suffering from ex-

treme dyspnœa, his respiration being very laborious even when he was quite at rest. The cough was of a wheezy, abortive character, attended by a very scanty expectoration of thin, frothy fluid. The skin was cool; the pulse 75, feeble; the finger-ends were slightly bulbous. The urine had a specific gravity of 1015, was pale-coloured, acid, and free from albumen. On exposing the chest for examination, a few patches of psoriasis were seen upon its anterior surface.

The shoulders were much rounded, so that the scapulæ were brought into an almost horizontal position. The supra-clavicular regions were depressed, and formed cup-like hollows behind the clavicles. The sterno-cleido-mastoid and scalene muscles were in powerful action during inspiration; forcibly dragging upwards the front of the thorax in one piece, as if by a sudden jerk, in order to assist the inspiratory process. The expansion of the chest was very deficient, but symmetrical and equal on the two sides. The thorax was rounded and prominent in front, so as to give it, together with the rounded shoulders, a somewhat globular shape in the upper part; but it was rather contracted than otherwise below the sixth rib, and flat in the axillary regions.

The note elicited by percussion over the front of the thorax, from the clavicle to the margin of the ribs on either side, and even over the præcordia, was perfectly clear. Posteriorly the percussion resonance was also abnormally clear over the base of both



lungs. The breathing was spasmodic and rather quick, the respirations being twenty-six in a minute. In some parts of the lungs the breath-sounds were very feeble, but more generally the inspiration was wheezy and sibilant, and the expiration very audible, much prolonged, and of a grave, snoring character. The breath-sounds were distinctly audible over the præcordia. Mucous crepitation was heard with inspiration in the bases of both lungs.

The heart was displaced downwards and inwards; its impulse was seen and felt only in the epigastrium immediately below the xiphoid cartilage, where its sounds were also distinguishable: there was no cardiac murmur. The liver also was displaced downwards; its dulness on percussion commenced somewhat below the normal line, and its border was felt a full inch below the margin of the false ribs. I prescribed a draught containing fifteen minims of tincture of squill, twenty minims of compound tincture of camphor, five grains of carbonate of ammonia, and two ounces of infusion of senega, to be taken every six hours, with five grains of the compound pill of hemlock every night.

Under this treatment he at first decidedly improved; but, presuming on the improvement, he exposed himself to inclement weather, and on November 20, in consequence of having taken cold, was even worse than he had been at the time of his admission. The cough was very troublesome, and he was raising a very considerable quantity of transparent frothy

expectoration. The respiration was most laborious; not only the muscles at the front of the neck, but also the lower intercostal and abdominal muscles, being in violent action. Cooing sounds were heard all over the chest; the crepitation in the bases of the lungs was of a drier character than before. The skin continued cool. Five minims of ipecacuanha wine were added to each senega draught; a hot linseed-meal poultice was ordered to be kept over the back of the thorax; and, the urine being perfectly normal, a blister was applied across the upper part of the sternum.

On the 24th the cough had already become less troublesome, except at night; the expectoration was less copious, and the breathing less gasping and laborious; the breath-sounds had also slightly improved; the pulse was 90 and feeble. There being nothing in the case to contra-indicate the use of opiates, a quarter of a grain of the hydrochlorate of morphia was added to the night pill.

On the 27th the improvement in the patient's condition was very marked: he had much less cough at night, the dyspnœa was less urgent, and the pulse had fallen to 72.

This amelioration continued for some time, until he again took cold from some fresh exposure: for, notwithstanding the man's distressing condition, as soon as he felt somewhat better, he did many little jobs of out-door work; requiring only slight physical exertion, but involving great risk of taking fresh

cold. After the more acute symptoms had subsided, he derived much benefit from taking the tincture of perchloride of iron and diluted hydrochloric acid, sometimes in combination with wine of ipecacuanha and small doses of the solution of hydrochlorate of morphia, and at other times with spirit of chloroform. When at his best, his respiration was laborious, and cooing sounds were always audible in some part or other of the lungs. He was finally lost sight of in the spring, when he considered himself as well as he was likely to become.

Here, then, is a characteristic case of general emphysema, in which there is no doubt, from the patient's statement, that the bronchitis had preceded the emphysema, and that the liability to bronchitis dated from the attack of rheumatic fever three years before. As to the exact nature of the pulmonary affection which first supervened on the rheumatic attack we can, however, pronounce no positive opinion, although the patient called it bronchitis. As a rule, the rheumatic poison is prone to attack the fibrous tissues and the serous membranes, rather than the mucous membranes and the skin, which are the parts more usually affected in persons of the gouty diathesis. Hence, we very commonly find bronchitis and certain cutaneous diseases either co-existing or alternating with fits of the gout; whilst pleurisy, pleuro-pneumonia, pericarditis, and endocarditis are the more frequent complications of acute

rheumatism. At the same time, bronchitis does no doubt occur, though more rarely, in this latter disease. I have seen two or three cases in which a primary attack of general bronchitis coexisted with rheumatic fever, and similar cases have been recorded by Dr. Latham in his *Clinical Lectures*, and by Dr. Fuller in his work on *Rheumatism*. My colleague, Dr. Thompson, had also, some time ago, under his care, a case of rheumatic fever, in which bronchitis in both lungs constituted the more urgent part of the patient's ailments. It is therefore by no means improbable that the same may have occurred in this case; and, at any rate, the patient can scarcely have been mistaken in the fact that immediately after the rheumatic attack he had begun to suffer from cough, to which he had not been previously subject. But as the patient did not come under observation until the rheumatic symptoms had quite passed away and the bronchitis and emphysema were both well established, I am unwilling to attach over-much importance to the relation between them; and I shall now direct your attention to those points in the case which render it particularly instructive with reference to the changes produced, by the emphysema, in the shape of the chest and in the mechanism of respiration.

The thorax had acquired, in a very marked degree, the somewhat globular form often associated with extensive emphysema, when it has commenced in youth, or in early middle life, before the costal cartilages have become ossified and unyielding. This

rounded form of the thorax is mainly due to actual dilatation, and is sometimes limited to the anterior walls ; but, when the emphysema is general, and consequently the dyspnœa severe and the cough frequent and abortive, the patient is habitually compelled to incline his body forwards and to elevate the shoulders ; until the shape of the posterior part of the thorax becomes also permanently altered. The change of shape in the shoulders is further promoted by the habit, which such patients acquire, of resting upon the elbows during paroxysms of orthopnœa ; in order that, the arms being fixed, the muscles of the shoulders and back may be converted into accessory muscles of inspiration.

But although, in these cases, the efforts at inspiration are the most obviously laborious, the difficulty of expiration, consequent upon the loss of contractile power in the lungs, is the real foundation of the patient's sufferings. The act of expiration being inefficiently performed, too large an amount of residual air is left at the close of each expiration in the air-vesicles, which of course are thereby rendered unable to admit a sufficient supply of fresh air at each succeeding inspiration. In order to overcome this difficulty, and appease the craving for fresh air, more violent inspiratory efforts are made ; and this is more especially the case when, to the loss of elasticity in the pulmonary tissue, is added the impediment to the action of the diaphragm, consequent upon the downward pressure of the over-distended lungs. All the

various muscles that can by any means be converted into accessory muscles of inspiration are then brought into powerful action. Accordingly, the sterno-cleido-mastoid muscles were seen in this patient spasmodically assisting the scalene muscles as elevators of the thorax, dragging it upwards in one piece at the moment of inspiration; whilst, as I have already said, the muscles of the shoulders and back were called into play with the same object.

All these manifestations of distress were absent in my other patient, William E. (Case XXXIII.): and you will remember that I attributed his comparatively comfortable breathing, at ordinary times, to the fact that the lungs, although extensively emphysematous, had not displaced the diaphragm downwards; so as to interfere either with the performance of its own proper function of enlarging the capacity of the thorax during inspiration, or with powerful accessory action on the part of the abdominal muscles in expiration. These latter had, consequently, sufficed to compensate in a great degree, though not without abnormal muscular effort, for the loss of expiratory power in the lungs. But in the case before us the circumstances were very different. Owing, probably, to the rapidity with which the emphysema had attained so large a development, the dilatation of the walls of the thorax had not sufficed to obviate the pressure of the enlarged lungs upon the heart, diaphragm, and liver, which were consequently all displaced downwards in a very marked degree; thus

rendering inoperative the means of compensation existing in William E.; and, hence, the extreme dyspnoea and painful inspiratory efforts exhibited by this patient even when at rest.

I now turn to the notes of a case belonging to the second of the two classes into which I have divided cases of bronchitic emphysema: the previous history of the patient affording no indications of gouty, rheumatic, or any other dyscrasia; and the emphysema having been developed only after severe and repeated attacks of bronchitis.

CASE XXXV.—Helen B., aged forty-nine years, a married woman, was admitted an out-patient of the Middlesex Hospital, under my care, on February 16, 1866. Her father had died asthmatical at the age of forty-two; her mother and two sisters were living and in good health. She had never suffered either from gout or rheumatism, nor was there any history of gout in her family. For six years past she had suffered constantly in winter from cough; which, in the first instance, was induced by attending at night upon a consumptive friend, without proper precautions against taking cold. She had previously enjoyed good health; and since that time she had usually been well and free from cough during the summer, until the year previous to her admission; during which she had never lost her cough, and had begun to suffer continuously from shortness of breath.

On admission her pulse was quiet and skin cool. The respiration was laboured; the cough exceedingly troublesome; and the expectoration generally thick and white, but occasionally streaked or specked with blood. The chest was everywhere resonant on percussion. Bronchitic sounds were heard more or less over both lungs, and the sound of expiration was prolonged and distinctly audible. The patient continued to attend for several weeks, and became much more comfortable, as regarded both the cough and the dyspnœa.

On April 7, however, she was admitted into the hospital for a fresh attack of bronchitis. On admission her lips were rather livid, and the cough and dyspnœa were very urgent. The pulse was 100, and very feeble; the patient had a languid, exhausted aspect and complained much of weakness and of inability for exertion. The chest expanded imperfectly; being, for the most part, simply elevated during inspiration by strong and well-pronounced action of the cervical muscles. The thorax was resonant on percussion from apex to base, and comparatively so even over the præcordia; posteriorly, also, it was abnormally resonant, excepting over the base of the right lung. The impulse of the heart could be neither seen nor felt in its normal situation, and respiratory sounds were heard over the cardiac region. The heart-sounds were free from murmur. Rhonchus, sibilus, and moist sounds were



abundantly audible over both lungs. The cough was hard, dry, and exceedingly troublesome; and the expectoration was very scanty. The urine was acid, specific gravity 1018, and non-albuminous.

I ordered a hot linseed-meal and mustard poultice to be applied over both the front and back of the thorax; the compound senega draught, with five minims of wine of ipecacuanha, and twenty minims of tincture of henbane, to be taken every six hours; and five grains of the compound pill of hemlock every night at bedtime. I also ordered her a liberal diet of eggs, beef-tea, and milk, with six ounces of brandy in the twenty-four hours. Under this treatment the cough became looser and less troublesome, and the expectoration much more abundant, somewhat opaque, and occasionally streaked with blood.

On April 30, the patient was noted as decidedly improving, and as sleeping quietly for several hours at night; but the respiration continued very laborious. The epigastrium and lower costal regions below the fifth rib, the lower part of the sternum, and also of the thorax posteriorly, were drawn inwards during the act of inspiration; the lower part of the abdomen, on the contrary, was protruded. Rhonchus and sibilus were heard over the whole chest; moist crepitating sounds in the bases of the lungs only. The pulse was 70, small and compressible. The fits of coughing were long, and the patient was expectorating much opaque, adhesive mucus; chiefly of a yellowish, but sometimes of a slightly rusty hue.

On May 11, the pulse was only 60, very small and compressible; the cough had become much less troublesome; the respiration less laborious; and, with the exception of some faint crepitation in the bases of the lungs, no adventitious sounds were discovered on auscultation. She was now ordered to take half a drachm of the syrup of iodide of iron, three times a day; and, being in a better state than was usual with her, was discharged from the wards. She continued, however, to attend as an out-patient until the month of September; during which period she continued to take the chalybeate in the daytime and the hemlock pill at night, and remained free from any accession of bronchitis.

On September 14, she came to inform me that she was about to go to Ireland, when the following last notes of her case were taken:—Pulse 66, small and feeble; respirations 24, comparatively tranquil. The sterno-cleido-mastoid muscles were in slight action even in ordinary respiration, and the epigastrium was still retracted during inspiration. The abnormal resonance of the chest remained unabated; no cardiac impulse could be seen or felt. The heart-sounds were distinct, and free from murmur; but the first sound was prolonged and accentuated. The respiration was dry and harsh; no moist sounds were anywhere audible; the sound of expiration was much prolonged. The patient considered herself to be much improved, as in truth she was; and said that she had little shortness of breath even

on moderate exertion, excepting in the morning; when she usually had a long abortive fit of coughing, and raised with difficulty a very scanty sputum. During the daytime she had very little cough, and no expectoration.

To this case the term bronchitic emphysema may be applied in the strict sense of the words; for the emphysema, so far as I could ascertain, had undoubtedly resulted from the frequent and severe bronchitic attacks, extending over a period of six years. As might naturally be expected in such circumstances, the emphysema had come on slowly, and the dyspnoea had been so masked by the urgent suffering of the bronchitis, that the patient had only become conscious of its existence when the emphysema had nearly attained the advanced stage which we witnessed on her admission to the hospital.

I have already said that there were no indications of any gouty or rheumatic tendency in this woman's history, and that her first attack of bronchitis supervened upon a definite and sufficient exciting cause. But there was one fact in her family history which bears upon the etiology of the bronchitis; and, therefore, indirectly also upon that of the emphysema, which was its secondary result. She stated that her father had died asthmatical at the age of forty-two. In the absence of more exact data, I would by no means insist upon any precise interpretation of this term; but, I think, the woman may fairly be assumed to

have inherited a tendency which would render her more than ordinarily liable to become the subject of chronic pulmonary disease.

With regard to the emphysema in this case, it appears to have been the immediate result of the bronchitis, and to have arisen mainly from the over-distension of the air-cells during the violent and prolonged fits of coughing ; but, of course, it may be a question whether hereditary delicacy in the tissues did not play a part in impairing their normal powers of resistance. It may be a question, also, whether repeated attacks of bronchitis do not, in themselves, lead to such defective nutrition of the pulmonary tissue as must diminish its proper tone and elasticity, and thus favour the development of emphysema. In such cases, however, the emphysema would be none the less the direct result of the bronchitis ; although not, as usually regarded, solely the result of mechanical causes.

There are some points connected with the mechanism of the respiration in this patient to which I shall briefly revert, after reading you my notes of another case in which the same phenomena were exhibited in a still more marked degree. But, before passing on to the other case, I should wish you to remark the striking improvement of this patient under treatment. For more than a year previous to her coming under observation she had suffered continuously from cough and dyspnoea, even when at rest ; but, when I last saw her, she had for several months had

scarcely any cough or dyspnoea except on first rising in the morning; she had no expectoration, and her breathing was much less laboured. In the first place I had prescribed only remedies calculated to relieve the bronchial irritation; but, as soon as this was subdued, she was put upon a course of the iodide of iron; a medicine which I have found of great value in cases of pulmonary emphysema, during the intervals between intercurrent attacks of bronchitis. Emphysematous patients are usually more or less anæmic, and therefore any form of chalybeate will often be serviceable; but the syrup of iodide of iron has appeared to me, in many cases, to have a quite peculiar efficacy in restoring tone to the system and in diminishing the liability to fresh accessions of bronchitis; thereby retarding also the further development of the emphysema.

I come, lastly, to that other case to which I have alluded; in which the emphysema appears likewise to have been the direct result of repeated attacks of bronchitis.

CASE XXXVI.—William C., aged fifty-five, a man of clear florid complexion, a coachman, was admitted an out-patient of the Middlesex Hospital, under my care, on November 10, 1864. He had for many years been subject to cough in winter, but was always comparatively free from it in summer. He had had no symptoms of either gout or rheumatism; nor, so far as he

was aware, had he any hereditary tendency to either of these complaints, or to any form of pulmonary disease. For a month previous to his admission he had been suffering from his usual winter cough; attended by a great degree of dyspnœa, and by a thin frothy expectoration, which was occasionally streaked with blood.

On admission, his skin was cool and moist; pulse 79, of good volume; tongue much furred. The respiration was laborious, the muscles in the front of the neck being in powerful action. The chest was broad and rounded in front, but flattened at the sides. It rose uniformly on the two sides, but expanded imperfectly; and the supra-clavicular spaces were depressed into deep cavities during inspiration. The chest was resonant on percussion in front from apex to base on both sides, even over the præcordia; and also, posteriorly, over the bases of both lungs, but more especially the left. A dry crepitating sound was heard with inspiration at the third intercostal space on either side, and also rather fine mucous crepitation in the base of the left lung. The expiration was prolonged, and rhonchus was heard in the bases of both lungs posteriorly. The heart was displaced downwards and inwards; its impulse was only perceptible at the epigastrium, where also its sounds were best heard; they were free from roughness or murmur.

I need not detain you with further details of the case on that occasion: the man improved much under treatment, and was discharged early in the year 1865.

In December of the same year he presented himself again in the out-patient room, suffering from his former ailments. His breathing was more laborious; not only the muscles of the neck, but the abdominal muscles also, being now actively engaged in assisting the respiratory efforts. The sounds on percussion and auscultation remained much as before.

He again derived benefit from treatment, and kept fairly well during the summer, but never lost the dyspnoea, and applied again for admission in January last (1867); when it was obvious that he was suffering from an attack of recent bronchitis engrafted on his chronic ailments, and that his respiration was unusually laborious even for such a condition. On the removal of his dress, the muscles in front of the neck and the abdominal muscles were seen to be in spasmodic action. The chest expanded very little, but was forcibly dragged upwards in front during the act of inspiration. The lower intercostal spaces were widened, but well marked; and, at the moment of inspiration, the lower ribs were distinctly drawn inwards. At the same moment the epigastrium also receded inwards and upwards, in such a manner that the lower margin of the ribs formed a prominent ridge round the front of the abdomen. The chest was everywhere resonant, both in front and behind. Cooing sounds were heard over the chest, with dry crackling as before at the third intercostal spaces, but no moist sounds. The heart-sounds were still

normal; the skin cool; tongue clean; pulse 76, and respirations 26.

The urgent bronchial symptoms having been first relieved by the use of sedatives and of the senega draught, I gave this patient also the syrup of iodide of iron, in combination with small doses of strychnia. He is now in a much less distressing condition, but still suffers from extreme dyspnœa on the slightest exertion; and, indeed, I need scarcely tell you that no treatment can avail in such a case to restore the breathing, even temporarily, to any such state of comparative comfort as that attained by the patient Helen B. when last seen. The dyspnœa will continue, and will be further aggravated by the fresh attacks of bronchitis from which the man will, inevitably, suffer on every fresh exposure to winter cold.

You cannot fail to have noticed, in the description of this patient's condition, the perversion of the mechanism of respiration, which existed in his case to an unusual extent; and to which I alluded as exhibited in a less marked degree by Helen B. The lower aperture of the thorax at the moment of inspiration appeared to be narrowed; the lower ribs and intercostal spaces and the epigastrium being retracted, and the upper part of the abdominal walls shrinking inwards and upwards, so that the margin of the ribs formed a prominent ridge.

In a less degree this occurrence is common in cases of extensive emphysema, attended by downward



displacement of the heart. The diaphragm, being pressed downwards by the heart and the enlarged lungs, becomes flattened instead of retaining its normal convex shape on the upper surface; and, according to Dr. Stokes, it may even possibly, in extreme cases, become concave. It still continues to contract during inspiration, but the effects of its action become inverted; for, being unable, under the pressure from above, to tighten its lateral wings so as to enlarge the capacity of the thorax, it overpowers the antagonistic muscles, and acting upon its attachments to the lower ribs and ensiform cartilage draws them inwards: thus actually contracting, in place of enlarging, the thorax; and counteracting, in place of aiding, the inspiratory efforts.

These phenomena are, however, rare in the extreme degree exhibited by the patient William C.; and I will therefore trespass on your attention a few minutes longer whilst I read to you, very briefly, the notes of two other striking examples of the same perversion of the mechanism of respiration, in patients whom several of you have seen in my out-patient room.

CASE XXXVII.—Edward D., aged thirty-nine, a commercial traveller, became an out-patient of the Middlesex Hospital, under my care, on May 9, 1867. His father had died of heart-disease at the age of forty-nine. The patient had been subject to cough in spring and autumn for many years. Latterly it had continued with more or less severity, during the whole winter,

and had been sometimes attended by extreme dyspnoea, amounting to orthopnoea during the greater part of the night.

At the time of admission he was pallid and emaciated and suffered much from dyspnoea on exertion. His chest was large and deep, and posteriorly somewhat bulging. The respiration was laborious, the muscles of the neck being actively engaged in the process as elevators of the upper ribs. The intercostal spaces were well-marked and the lower ones appeared to be widened. At the moment of inspiration the lower ribs and intercostal spaces, the xiphoid cartilage, the epigastrium, and the flanks for a short space immediately below the last rib, were drawn inwards. At the same moment the supra-clavicular regions were depressed. The breath-sounds were feeble, and vocal vibration was almost wanting in front of the thorax. Posteriorly rhonchus and sibilus were audible throughout the lower lobes of both lungs. The heart was seen to beat only in the epigastrium; its sounds were clear, but audible only in the epigastrium and at the right border of the lower third of the sternum. The urine was non-albuminous.

CASE XXXVIII.—James F., aged 56, stable-man, was admitted an out-patient of the Middlesex Hospital, under my care, on February 1, 1867. He had had rheumatic fever at twenty years of age; and had frequently, since that time, had rheumatism in a milder form. For the last six or seven years he had

been subject to cough and dyspnoea; chiefly, but not exclusively, in winter. During the last few months previous to his admission he had suffered from these complaints in an aggravated degree.

On examination the thorax was found to be everywhere abnormally resonant. The respiration was harsh and expiration prolonged. Rhonchus was audible over the whole front of the chest, and moist crepitating sounds were heard in the bases of both lungs posteriorly. The impulse and sounds of the heart were felt and heard only at the epigastrium. During inspiration the lower lateral parts of the chest, the xiphoid cartilage, the epigastrium and the flanks below the last rib, were forcibly drawn inwards.

In concluding these remarks, I must remind you that although, for the sake of clearness in explaining to you the different factors which may produce pulmonary emphysema, I have been obliged to divide cases of that disease into groups, according to the predominance of one or other of these factors; you will find, in practice, no such sharp lines of distinction. The two factors, degenerative change in the pulmonary tissues and mechanical over-distension of the vesicles by air, may and do combine, so to speak, in every varying shade of proportion. Although therefore, in occasional cases, such as some of those which I have selected for relation, the action of the one or of the other factor may have been so obviously

predominant as to be entitled to rank as the exclusive cause; in the infinitely larger number of cases lying between these extremes it is often impossible, unless they come under observation in the earlier stages, to determine the precise degrees in which the two factors have respectively contributed to the result. We can only say with confidence that both have been at work.

## LECTURE VII.

*BRONCHITIS AND DISEASES OF THE HEART.*

RELATIONS OF BRONCHITIS WITH DISEASES OF THE HEART—BRONCHITIS A CONSEQUENCE OF DISEASE OF THE LEFT SIDE OF THE HEART; A CAUSE OF DISEASE OF THE RIGHT SIDE OF THE HEART—INCOMPETENCE OF THE MITRAL VALVE A PREDISPOSING CAUSE OF BRONCHITIS: MODE OF ACTION: SECONDARY RESULTS; ALBUMINURIA; ANASARCA; HÆMOPTYSIS; PULMONARY APOPLEXY—EFFECTS OF INCOMPETENCE OF THE MITRAL VALVE IN CAUSING BRONCHITIS PRIMARILY MECHANICAL—SAME EFFECTS PRODUCED BY CONSTRICTION OF THE MITRAL ORIFICE—ACTION OF MITRAL INCOMPETENCE INDIRECT: OF MITRAL CONSTRICTION DIRECT.

GENTLEMEN,—Until within a few days I have had under my care in Northumberland Ward two female patients, occupying beds almost opposite to one another, both of whom were suffering from bronchitis associated with disease of the heart. In one of these patients, who is now convalescent, the cardiac disease dates from an attack of rheumatic fever more than two years ago, whilst the bronchitis is comparatively recent. In the other patient, who died a few days ago, the bronchitis had preceded the disease of the heart.

In our convalescent patient, the principal seat of the cardiac lesion is in the left side of the heart; and the incompetency of the mitral valve to prevent the reflux of blood into the left auricle has been, certainly,

at least the predisposing cause of the bronchitis which has become associated with it. In the patient whose illness was fatal, the principal seat of the cardiac lesion was, on the contrary, in the right side of the heart; and the hypertrophy and dilatation of the right ventricle, together with the incompetency of the tricuspid valve to prevent the reflux of blood into the right auricle, were the direct results of the bronchitis and pulmonary emphysema which had preceded them.

This latter condition of heart and lungs was exhibited also, in a very striking degree, by a male patient who died in the hospital under my care in May last: and I shall, therefore, make use of his case as an additional illustration of the subject, and show you the preparations I have preserved for the purpose.

You may remember that in a former lecture I told you that bronchitis might stand to disease of the heart in the relation either of cause or of consequence: and I have selected these three cases as texts for my clinical remarks to-day, on account of their exemplifying so clearly the opposite relations between the two diseases.

I shall first read you the notes of our convalescent patient, still in Northumberland Ward, in whom the cardiac disease had preceded the bronchitis.

CASE XXXIX.—Lydia P., aged 26, a single woman, was admitted into the hospital under my care on the

10th of last September (1867). In the year 1865 she had been for many weeks an in-patient under my care with rheumatic fever. When admitted on that occasion she had been ill for fourteen days, and there was already a loud systolic murmur audible at the apex of the heart. The case was one of ordinary rheumatic fever with cardiac complication; and, though she left with a damaged heart, she had remained quite free from any pulmonary affection. In March of the present year, however, she was again an inmate of the hospital, under Dr. Thompson's care, for bronchitis and heart-disease. She had another bronchitic attack during the summer; and was suffering in the same manner when re-admitted in September.

On this last admission, the patient stated that from the time of the rheumatic fever she had experienced difficulty of breathing in going up-stairs or in lifting heavy weights. She was a domestic servant, obliged to be much on her feet, and about a month before her admission she observed that her legs had become swollen. Nearly at the same time, she had begun to suffer great pain and discomfort in the region of the heart; and, also, increased inconvenience from shortness of breath on exertion. The cough, which had never entirely left her since the last attack of bronchitis, had also become more troublesome and the expectoration more abundant.

At the time of her admission she was coughing much and raising a copious frothy expectoration.

The lower limbs were very œdematous. The urine had a specific gravity of 1026 and contained a trace of albumen. The pulse was 80, very weak, and irregular both in force and rhythm. The breathing was laboured and there was occasional orthopnoea. The chest was quite normally resonant in front; but, posteriorly, there was dulness on percussion from the middle of the left scapula downwards: a fact which was also noted by Dr. Thompson, when she was under his care in March. The area of cardiac dulness was increased, especially towards the right; the heart's impulse was diffused, forcible, and heaving; and a loud systolic murmur was heard over the præcordia. This murmur was loudest at the apex of the heart and over the lower third of the sternum, and was also distinctly audible at the lower angle of the left scapula. Expiration was greatly prolonged. Rhonchus and sibilus were heard over the greater part of both lungs posteriorly.

It was quite evident, from the patient's state, that the flow of blood through the lungs was so impeded that the right ventricle of the heart had become first over-distended with blood and then probably dilated. Hence the increased area of cardiac dulness towards the right side and the general venous congestion resulting in albuminuria and œdema of the lower extremities. Neither of these symptoms had existed previous to the recent attack of bronchitis, and you are aware that at the present moment they have both entirely disappeared; their temporary duration



apparently proving their dependence upon a temporary condition.

The impeded flow of blood through the lungs is due, in this and similar cases, to two causes; the one permanent, the other only of temporary duration.

The first and permanent cause is the incompetence of the mitral valve, allowing the regurgitation of blood through the mitral orifice during the contraction of the ventricle; thus over-distending the left auricle and impeding the flow of blood into it from the lungs. This impediment tends to keep up a constant state of pulmonary congestion; which, in its turn, retards the flow of blood into the lungs from the right ventricle, and tends to create more or less general venous congestion.

The other and temporary cause is the bronchitis; which, by interfering with the due performance of the respiratory function, increases the already existing impediment to the pulmonary circulation; and, thereby, still further retards the flow of blood out of the right ventricle and tends to aggravate the venous congestion.

As the albuminuria and anasarca, resulting from the impeded state of the circulation through the right side of the heart, disappeared, in the case we are considering, with the temporary attack of bronchitis; we must, consequently, presume that the permanent mitral incompetence was insufficient, by itself, to produce the degree of venous congestion which in-

volves these serious results. And in fact, as you well know, many persons are the subjects of mitral incompetence during a large portion of their lives without any such consequences.

In our patient, at any rate, these alarming symptoms had only supervened coincidentally with the bronchitis; and it was therefore clearly necessary to direct the treatment, in the first place, towards the removal of that complication; but it was also most desirable to relieve the venous congestion as soon as possible.

For the attainment of both these objects similar means were likely to be efficacious; namely, rest in the recumbent posture and medicines calculated to promote free expectoration and action of the skin. A brisk hydragogue purge would also tend directly to relieve the general venous congestion and indirectly likewise the congestion of the kidneys. I accordingly desired that the patient should remain in bed, and ordered her a full dose of compound jalap powder immediately, and a draught every four hours consisting of two drachms of the solution of acetate of ammonia, five minims of antimonial wine, twenty minims of spirit of nitrous ether, and ten drachms of camphor water.

On the 12th her pulse had fallen to 66, but continued irregular. The cough continued troublesome, and she expectorated a frothy, glairy, mucus specked with blood. Moist sounds were heard over the back of the chest. The dyspncea was still distressing;

the patient requiring to be constantly propped up in a semi-recumbent position, and sometimes for an hour or two being compelled to sit quite upright and even to lean forwards in order to get breath: she also complained much of a sense of tightness across the chest. The œdema of the legs had somewhat abated, and the urine no longer showed any trace of albumen either with heat or nitric acid. It was high-coloured, sp. gr. 1026, and deposited on standing a large quantity of pink lithates. I now ordered her the compound squill draught, with twenty minims of tincture of henbane and a scruple of acetate of potash, every six hours; and directed a linseed meal and mustard poultice, consisting of ten parts of the former to one of the latter, to be applied over the front of the chest and renewed every four or five hours.

On the 14th her condition had not improved. She had passed a sleepless night and still complained of tightness in the chest; her eyes were prominent, her respiration very laborious, and she had almost constant orthopnoea. The cough had not diminished; the expectoration was scanty, glairy, and tenacious. The œdema had very considerably subsided.

During the next two days she varied little, but on the 16th began to vomit, on which account I gave her the effervescing citrate of potash draught; with fifteen minims of tincture of digitalis, and three grains of citrate of iron every six hours: I also

ordered two ounces of brandy to be given her in divided doses during the day.

On the following morning we found that she had slept better, and that her cough was easier and the expectoration more opaque. Her breathing was however very quick, the respirations being upwards of 40 in a minute. Her pulse, which had varied greatly in frequency, was again 66. Mucous crepitation was now audible in the bases of both lungs posteriorly. The œdema of the legs and thighs had almost disappeared, and the urine remained free from albumen. I desired the effervescing draught to be continued and a pill to be taken nightly, consisting of five grains of the compound pill of hemlock and a quarter of a grain of the hydrochlorate of morphia.

She remained for some days in much the same condition, but on the evening of the 20th became worse without any obvious cause. She suffered from constant orthopnoea, and her countenance had an anxious aspect and a dusky, bloated appearance. The urine again exhibited albumen, in much larger quantity than at first, and she raised a few sputa of bright florid blood. Pulsation was now also visible, for the first time, in the veins of the neck, being more evident on the right than on the left side; a circumstance which I have observed before in similar cases.

In this instance I have no doubt that the pulsation was caused by a recoil wave of blood from the right auricle; for the passage of blood downwards from

the head being intercepted by gentle pressure on the vein with the finger, the empty vein was seen to fill again from below, in a pulsatory manner, as nearly as possible synchronously with the contraction of the ventricle.

I feel satisfied, therefore, that although I could distinguish no murmur in the situation of the tricuspid orifice, there was, at this time, incompetency of the tricuspid valve and regurgitation of blood into the right auricle during the contraction of the ventricle; a condition which as I explained to you on a former occasion may be only temporary.\* That no murmur referable to the tricuspid orifice could be heard, apart from the systolic murmur audible over the whole præcordia, must be attributed to the absence of any roughness of the valves; so that a not very forcible reflux current might take place, either without giving rise to any murmur at all, or else only to a murmur so faint that it was masked by the louder mitral murmur with which it would be synchronous.

Again, the reappearance of albumen in the urine in such considerable quantity was a proof of engorgement of the systemic capillaries, such as would arise from incompetence of the tricuspid valve.

On the other hand, the hæmoptysis could only be indirectly, if at all, ascribed to this cause, for it was indicative of pulmonary congestion; and, as you are aware, obstruction to the flow of blood through the

\* See page 142.

right side of the heart tends rather to prevent than to promote congestion of the lungs. The hæmoptysis was of course mainly caused by the incompetence of the mitral valve, retarding the flow of blood from the lungs into the left auricle; but it is certain also that the increased bronchial irritation was another factor in its causation; and, lastly, it is quite conceivable that the engorgement of the systemic capillaries, reacting backwards and tending to check the current of blood passing through the aorta, may have conduced to the same result.

Meantime, the patient began to improve decidedly after the occurrence of the hæmoptysis; as though the hæmorrhage had relieved the congestion of the pulmonary capillaries.

Only a few years ago, a patient in the condition of this woman would have been bled as a matter of course; and, I have little doubt, with at least great temporary benefit. I have myself, sometimes, employed a moderate venesection, with much advantage, in pulmonary congestion consequent upon disease of the left side of the heart. In the present case, however, such manifest and speedy improvement followed the hæmorrhage from the lungs, that the question of taking blood, even by leeches, did not arise.

The citrate of iron was now omitted from the effervescing draught, and five minims of wine of ipecacuanha, and thirty minims of tincture of henbane were added to it. The night-pill, from which

the patient had derived much comfort, was continued.

On the 26th the cough had become less troublesome, and the expectoration was scanty, transparent, and streaked with black carbonaceous-looking matter. The orthopnoea had subsided, and the breathing was somewhat easier. The pulsation in the veins of the neck was no longer visible. The urine was clear and free from albumen.

On October 1, she had passed a good night, was coughing much less, and had raised scarcely any expectoration. The pulse was 69, irregular, both in rhythm and force. The systolic murmur was still distinct at the left apex of the heart, but it faded towards the base, and was less extensively heard over the cardiac region than at the time of the patient's admission: it was just audible over the lower third of the sternum. The respiration was harsh and sibilant, expiration prolonged; no moist sounds were heard. I desired the night-opiate to be omitted, and prescribed a draught containing fifteen minims of tincture of digitalis, and ten minims each of diluted hydrochloric acid, tincture of perchloride of iron, and spirit of chloroform, in an ounce and a half of water; to be taken three times a day.

During the three weeks which have elapsed since then the patient has made rapid progress. The expectoration has ceased, and the cough has greatly abated; the œdema has entirely disappeared; the urine has continued free from albumen and also from

any excess of lithates. The pulse has become stationary at about 72, and much more regular; the breathing is less laborious, and the respirations have fallen to 23 in a minute. The systolic murmur is fainter, and entirely infra-mammary, and the patient will be discharged convalescent on Tuesday next.

Here, then, is a case in which disease of the left side of the heart produced, at least, a strong predisposition to bronchitis in a patient not previously subject to that complaint; and, when bronchitis did occur, protracted its course and added greatly to its danger. The patient has indeed, at length, in a great measure recovered from her recent attack; but the same predisposing cause remains in operation, and the bronchial membrane, being left in a delicate state, will be even more prone than before to take on the inflammatory process. Possibly, also, some permanent nutritive change in the lungs, kidneys, or heart may have resulted from this last illness. Winter is at hand, and should our patient again take cold, she will certainly suffer from a repetition of her ailments.

In any circumstances an attack of bronchitis, when complicated with disease of the mitral valve, is an incident of very serious import as regards the future prospects of a patient; but it is doubly so in a person who, like our patient, has to work for her livelihood and cannot escape from inclement weather. Among the wealthier classes of patients much more of course



can be done to invigorate the general health; and, by warm clothing and avoidance of exposure, or change of climate, to ward off attacks of bronchitis: thus retarding often, for an indefinite time, the serious results which are too likely to follow a repetition of such attacks, in persons whose circulatory system is permanently damaged.

CASE XL.—I have just seen, before her departure for the south of France, Mrs. H. T., a lady aged fifty-six, whose case exemplifies the great benefit to be derived from such prophylactic treatment. For several years before I was consulted she had had winter attacks of bronchitis, protracted year by year further into the spring and summer. On examining her last autumn, I found that there existed incompetence of the mitral valve; and I ascertained from the history of her case that this lesion had certainly preceded the occurrence of the bronchial attacks. She had also, at the time I saw her, slight œdema of the ankles and her urine showed a trace of albumen. On my recommendation this lady passed last winter in one of the health-resorts of the south of Europe, where she was able to be much in the open air and yet to escape all the ordinary exciting causes of her bronchial ailment. There she gradually lost her cough; from which, on her return in the early summer, I found her perfectly free, as well as from œdema and albuminuria; but the mitral lesion of course remained.

She spent the summer at home and continued well

for some months; but, having delayed going southwards again longer than I advised, the recent accession of colder weather brought on, as I had foreseen, a return of bronchitis. The attack having been mitigated, she will proceed southwards at once, and will again, I have no doubt, derive great advantage from her residence in a more genial climate.

Notwithstanding the difference between the prospects of this lady and those of our patient Lydia P., consequent upon the difference in their pecuniary circumstances, the two cases are very similar in their medical aspects; and they correspond, in all essential respects, with many that you have seen in the out-patient practice of the hospital, where bronchitis has been a sequel to affections of the left side of the heart.

In Lydia P., it is true, the bronchitis had been preceded also by rheumatic fever, but she had no pulmonary complication during the rheumatic attack, and indeed did not begin to suffer from bronchitis until two years later; so that we cannot in her case attribute the bronchitis to the rheumatic fever as its direct cause. At the same time there is no doubt that it was the remote cause, through the medium of the cardiac lesion which it had produced.

The mode in which the cardiac lesion in such cases tends to produce bronchitis, and certain other pulmonary ailments to which I shall presently advert, is primarily mechanical. The regurgitation of blood

into the left auricle during the contraction of the ventricle, consequent on the imperfect closure of the auriculo-ventricular orifice, keeps the auricle over-distended and impedes the entrance of blood into it from the pulmonary veins. Hence arises a condition of chronic congestion of the pulmonary capillaries, which may perhaps in itself constitute such a predisposition for bronchitis that very slight external causes may suffice to excite it; but which, more probably, creates this predisposition indirectly, by altering the nutrition of the bronchial membrane.

Sometimes, as you are aware, this state of chronic congestion gives rise to bronchorrhœa, a copious watery secretion from the bronchial surface. At other times, as in the case of Lydia P., it produces an attack of hæmoptysis; and again in some cases it results in pulmonary apoplexy. All these last-named consequences of congestion of the pulmonary capillaries are more liable to happen in conjunction with bronchitis; that disease contributing to induce them by aggravating the obstruction to the circulation through the lungs. I need scarcely say that the super-vention of either of the two latter of these conditions on the bronchitis adds, greatly, to the gravity of the case and to the probability of a suddenly fatal termination.

CASE XLI.—Miss C., a middle-aged lady who had been under my care for many weeks, during several successive winters, for chronic bronchitis associated

with incompetence of the mitral valve, died at length almost suddenly in one of her attacks, in consequence of the supervention of pulmonary apoplexy.

Her complaint had been unattended by any renal disease, neither had she shown any symptoms of anasarca; but the bronchitis had become more severe and protracted year by year. There had appeared no greater reason on the last occasion than on several previous ones to expect a fatal result; but it seems likely that in such cases changes gradually take place in the walls of the congested vessels, rendering them less able to bear distension. And thus, at length, even the slight addition to the habitual degree of obstruction which would be induced by a mild attack of bronchitis, may be sufficient to cause rupture of the coats of the vessels and bring on pulmonary apoplexy.

CASE XLII.—I had also under my care during last winter another lady, Mrs. R. N., aged forty-eight, who had long been the subject of mitral regurgitant disease, and who had suffered throughout the previous winter from severe bronchitis. She had recovered and had remained fairly well during the summer, but in the autumn when I first saw her she had a return of her complaint. The symptoms at that time were purely those of bronchitis. The skin was cool, the pulse rarely above 72, the urine normal, and there was no œdema of the lower extremities. The chest was normally resonant and sibilus and rhonchus were

heard over both lungs. The cough was troublesome, the expectoration thick, tenacious and imperfectly aërated. There was much dyspnœa on exertion, the respiration was laborious and rather quick, and the patient frequently suffered from orthopnœa at night, but was able to be up and leave her bed-room in the daytime.

The case was very tedious, as such cases almost invariably are, and during many weeks my patient made little progress; any ground gained one week being often lost during the next and, sometimes, without any obvious cause. At length in February the lungs became œdematous, the ankles swelled towards night, and the urine began to contain a considerable quantity of albumen. The expectoration continued of the same character as at first, but was specked, at times, with florid blood: and, on a few occasions, single sputa had a rusty hue. These were alarming symptoms, indicating a tendency both to dropsical effusion and to pulmonary apoplexy, and made me apprehensive as to the result. I prescribed a draught to be taken every six hours, containing one scruple of acetate of potash, two drachms of the solution of acetate of ammonia, twenty minims each of the tinctures of squill and digitalis and of spirit of nitrous ether, in nine drachms of camphor water. Under this treatment the secretion of urine greatly increased and the œdema rapidly subsided. I then gave her, with great advantage, tincture of digitalis in combination with the tincture of perchloride of

iron and a hemlock and morphia pill at bed-time to allay the cough.

In the course of three weeks the patient became very much better: the cough abated, the blood disappeared from the expectoration, the urine ceased to show any trace of albumen, and she was able to be moved to Hastings. There she passed the colder months of spring and came home towards the end of May, feeling well, and her breathing being so far relieved that she could move about with comfort on level ground. The incompetence of the mitral valve and the consequent tendency to a recurrence of bronchitis on the first occasion of her taking cold, remain, of course, as before.

I may observe, in connection with this case, that I have found the combination of digitalis with the tincture of perchloride of iron remarkably useful in cases of incompetence of the mitral valve. Under its use the pulse often becomes more regular and of better volume, and this quite independently of the existence of anasarca. At the same time such patients, when they have previously suffered much from dyspnoea and from pangs in the region of the heart on making any bodily effort, frequently lose these symptoms and become, at any rate for a considerable time, comparatively comfortable.

In the several cases to which I have hitherto referred, the obstruction to the flow of blood through

the left ventricle has been the incompetence of the mitral valve. This is an exceedingly common cardiac lesion, and it would be easy to multiply examples in which it has been obviously the predisposing cause of bronchitis. But as the effects of this lesion are, in the first place at least, purely mechanical, it follows, of course, that any other cardiac lesion which in like manner impedes the flow of blood through the left side of the heart, and thereby retards its exit from the lungs, will equally tend to produce pulmonary congestion and create a predisposition for bronchitis.

Constriction of the mitral orifice does, in fact, produce precisely the same effects upon the pulmonary circulation as incompetence of the mitral valve, although the action of the one is direct and of the other indirect. Incompetence of the mitral valve causes the obstruction to the pulmonary circulation indirectly; by allowing a backward flow of blood into the left auricle during the contraction of the ventricle. Constriction of the mitral orifice, on the contrary, obstructs the pulmonary circulation directly, by presenting an impediment to the onward flow of blood out of the left auricle into the ventricle. Of these two lesions, the latter is far less common than the former, and I have not at the present time a single case under observation. I will therefore read you the notes of a well-marked case which was in the hospital, more than two years ago, under the care of my friend and late colleague Dr. Stewart, and in

which the mitral constriction and its effects upon the lungs were verified by post-mortem examination.

CASE XLIII.—Charlotte F., aged forty, married woman, was admitted into Murray ward under the care of Dr. Stewart in November 1865. When she had been in the hospital for some weeks Dr. Stewart directed my attention to the case as one in which I should take peculiar interest, and I then took the following notes.

Her family history was satisfactory, with the exception of the death of her mother at thirty-four, of decline. She was herself very pallid-looking, and stated that she had long experienced shortness of breath on exertion. She had first suffered from bronchitis eight or nine years before her admission into the hospital, and from that time had had frequent attacks, though rarely severe enough to confine her to the house for more than a few days together. During one of the more recent of these attacks her feet had swelled for several successive days, and her face had occasionally been puffy in the morning after she had suffered much from dyspnœa during the night. She had also at times had palpitation of the heart, especially when walking or going up stairs, and had suffered more from it of late. She had been better than usual during the summer previous to her admission, but had taken cold early in October, which brought on her cough and laid her up for a time. When she began to move about, she noticed that her ankles were



œdematous and, presently, her legs also swelled. She had several times noticed that her expectoration was streaked with blood.

On December 15, when I first examined her, she had a dry noisy cough, attended by very scanty expectoration. Her face was puffy, and her hands, feet, and legs were very œdematous, pitting deeply on pressure. Her pulse was 102, feeble and compressible; the respirations were quick and very laborious; urine high-coloured, specific gravity 1030, loaded with lithates and copiously albuminous. Respiration was for the most part dry and attended by loud rhonchus and sibilus, but there were some moist sounds in the base of the left lung. A loud diastolic\* blowing murmur was heard below the left mamma. Its point of greatest intensity was close to the right border of the left nipple, and it was more faintly heard over the præcordia, and in the axilla, where it had a musical tone; it was not audible posteriorly. Both cardiac sounds were clear at the aortic and pulmonary orifices, but the second sound was much accentuated in the latter situation.

The patient gradually sank, and died on December 22. Towards the end of life, the proportion of albumen in the urine decreased, and the pulse acquired an intermittent character.

At the post-mortem examination, the lungs were much congested and presented scattered patches of

\* It is so called in my note book; but was, doubtless, what is now commonly known as a præ-systolic murmur.

pulmonary apoplexy. There was effusion into both pleural cavities, and the lower lobes of both lungs were carnified. The heart was enlarged, the right cavities being dilated, especially the auricle, and the right ventricle much hypertrophied; its walls were four lines in thickness. The tricuspid orifice was small, barely admitting two fingers. The left auricle was much dilated; the ventricle of moderate size. The edges of the mitral valve were enormously thickened and the orifice would scarcely admit the tip of the little finger. The surface of the liver was uneven, its capsule was much thickened, and it had, on section, a nutmeg appearance. The kidneys were normal.

In this case the mitral constriction produced, as you have seen, the same results as did the mitral incompetence in the cases previously described; that is to say, hyperæmia of the lungs, and predisposition, at least, to bronchitis. The patient had in fact suffered from repeated attacks of bronchitis, during a period extending over many years; until, at length, the combined cardiac and pulmonary diseases had given rise to venous congestion and its consequences.

Moreover, serious secondary changes had in the meantime taken place in the heart itself. The long-continued impediment to the flow of blood from the lungs through the left side of the heart, caused by the narrowing of the mitral orifice, had checked, in a corresponding degree, the flow of blood towards the lungs, through the right side of the heart. This

check to the onward current of the blood, had, of course, retarded its exit from the right ventricle, which thereby became excited to increased activity in order to overcome the obstruction. The natural consequence of such over-action ensued, and the right ventricle became, as we have seen, much hypertrophied. It being, however, impossible to remove the impediment to the onward current of blood presented by the narrowed mitral orifice, the backward pressure of the stream distended and gradually dilated both auricles; and eventually also, though to a less extent, the right ventricle.

Finally, as a result of these changes in the heart, the mechanical hyperæmia of the lungs had, during the woman's last illness, produced the scattered patches of pulmonary apoplexy revealed by the post-mortem examination.

We have thus pretty fully considered the first of the two relations set forth, at the beginning of this lecture, as subsisting between bronchitis and disease of the heart; namely, that in which the primary cardiac lesion is seated in the left side of the heart, and is, at least, the predisposing cause of the bronchitis which it precedes. I find that time will not allow of my entering to-day on the subject of the opposite relation between the two diseases, that, namely, in which bronchitis precedes and directly produces disease of the right side of the heart; and I must, therefore, defer its consideration until our next meeting.

## LECTURE VIII.

*BRONCHITIS AND DISEASE OF THE RIGHT SIDE  
OF THE HEART.*

DISEASE OF THE RIGHT SIDE OF THE HEART A CONSEQUENCE OF BRONCHITIS AND EMPHYSEMA—HYPERTROPHY OF THE WALL OF THE RIGHT VENTRICLE—DILATATION OF THE RIGHT CAVITIES—ORIGIN OF THE HYPERTROPHY IN THE EFFORTS OF THE RIGHT VENTRICLE TO OVERCOME THE OBSTRUCTION TO THE PULMONARY CIRCULATION—ORIGIN OF THE DILATATION IN OVER-DISTENSION OF THE CAVITIES ARISING FROM THE INABILITY OF THE VENTRICLE TO DRIVE THE BLOOD FORWARD INTO THE LUNGS—RESULTS OF DILATATION OF THE RIGHT SIDE OF THE HEART: VENOUS CONGESTION AND ITS CONSEQUENCES—BRONCHITIS OFTEN SECONDARY TO OTHER DISEASES: NO CONSEQUENT CHANGE IN RELATION OF BRONCHITIS AND EMPHYSEMA TO DISEASE OF THE RIGHT SIDE OF THE HEART.

GENTLEMEN,—Let me invite your attention to-day to the two cases to which I alluded at the commencement of my last lecture, as exemplifying the second of the two relations there set forth between bronchitis and disease of the heart. You doubtless remember that in all the cases I read to you on that occasion, as illustrations of bronchitis consequent upon heart-disease, the primary cardiac lesion was seated in the left side of the heart: whereas, in the cases I am about to bring before you to-day, as examples of heart disease caused by bronchitis and emphysema, you

will see that the principal seat of the cardiac lesion was, on the contrary, in the right side of the heart.

We will take first in order the case which occurred first in time, and which affords, perhaps, the best contrast to the cases already discussed, on account of the absence of any but the pulmonary and cardiac diseases whose mutual relations it is my present object to elucidate.

CASE XLIV.—Harry A., aged fifty, a bricklayer who had been in early life a prize-fighter, was admitted into the Middlesex Hospital on May 13 of the present year (1867) under the care of Dr. Thompson, who kindly transferred the case to me as one in which I took especial interest.

The family history of the patient was satisfactory, there being no hereditary tendency to gout, rheumatism, or phthisis, and both his parents having lived to upwards of eighty years of age.

The man himself, as might have been expected from his early occupation, had led an irregular life, and had at one time taken both gin and beer to excess. He had also been careless of his health, exposing himself much to the weather and habitually allowing his outer garments, when wet, to dry upon him. From the age of twenty-four he was for several years almost constantly in training and repeatedly entered the ring, but quitted it finally at about the age of thirty, without ever having sustained any serious injury.

Until five or six years before his admission into the hospital he had been a healthy man, but he then took cold, and was attacked by cough, which lasted for several weeks. Every subsequent winter he had had similar attacks, which were attended by slight dyspnoea and latterly also by palpitation; but both these symptoms always subsided with the cough. The palpitation came on chiefly at night and was always worst when he had been drinking.

The illness for which he was admitted into the hospital had begun, about the previous Christmas, as an ordinary catarrh, with aching of the back and limbs followed by his usual winter cough. The dyspnoea and palpitation had then become more severe than on any previous occasion, and he had for the first time been incapacitated for work. He had however been able to go out occasionally until within three weeks of his admission, when the cough and dyspnoea had suddenly become much aggravated, and the expectoration much more copious. Since that time he had been confined to the house, and his difficulty of breathing had latterly increased to such an extent as to compel him to be propped up in bed.

On admission the patient's face was dusky, his lips and tongue were purple, and his eyes prominent. His chest was rounded in front and flat at the sides, generally very resonant on percussion, and comparatively so even over the præcordia. The resonance was less marked below the right than below the left

clavicle, and there was an ill-defined area of comparative dulness at the third right costal interspace. There was very little of either expansion or elevation of the thorax, even when the patient breathed forcibly, and the deficiency of expansion was more strongly marked on the right side than on the left. The diaphragm appeared to act freely and the respiration was chiefly abdominal. The lower intercostal spaces were well-marked, widened, and forcibly drawn inwards during the act of inspiration.

Loud snoring and creaking rhonchi were heard in the chest before and behind, having here and there, more especially in the base of the right lung, a moister character. The heart's impulse was faintly visible about two inches below the nipple, and there was slight cardiac dulness from the sixth interspace downwards.

The pulse was 96, the respirations were 30 in a minute, the heart-sounds free from murmur. The skin was cool; the cough not very troublesome; the expectoration frothy, but mixed with opaque greenish or yellowish masses. There had been no hæmoptysis. The urine was scanty, acid, sp. gr. 1012, and non-albuminous. The patient complained chiefly of loss of appetite, weakness and shortness of breath; he suffered so much from orthopnœa that he could never lie down, and sat constantly propped up in bed.

From the time of his admission he rapidly declined, his breathing became more and more oppressed, his pulse rose to 120, and he died on the night of May 18.

On post-mortem examination the right lung was found to be perfectly free from adhesions; it was, as you see in the preparation before you, of very large size. On the anterior surface of the middle and upper lobes, a patch of the pulmonary pleura, about two and a half inches in diameter, was much thickened, opaque, and puckered in the centre. There was a similar, but much smaller, patch a little higher up on the same lung.

The pulmonary tissue corresponding to these patches is, as you may see, to a considerable depth, consolidated, dense and of a bluish-slate colour, but smooth on section and traversed by numerous white fibrous bands which pass into it from the thickened pleura. Its appearance corresponds very closely with that described by Rokitansky as interstitial pneumonia, and, by other writers, as fibroid degeneration of the lungs. The walls of the smaller bronchial tubes in this consolidated portion of the pulmonary parenchyma are much thickened, and the orifices gaped when the tubes were cut across. They were filled with puriform mucus and their lining membrane was much congested. The white fibrous bands extended beyond the consolidated portion of lung, but became finer and less obvious as they spread into the crepitant lung-tissue. The lung-tissue was everywhere of a dark colour and was generally emphysematous, but without presenting any distinct bullæ.

The left lung, which I have not preserved, was almost everywhere adherent and was much smaller than



the right. It was not consolidated in any part, and the pulmonary pleura was not thickened, but the lung-tissue was traversed by fine white lines identical in character with those observed in the crepitant parts of the right lung. Both lungs were very œdematous.

You will observe that the heart is also very considerably enlarged. The right cavities are much dilated and the apex of the organ is formed by the right ventricle. The valves are all healthy, with the exception of some small atheromatous patches on the base of the mitral valve.

The extensive adhesions of the left lung, and the patch of thickened pleura over the right lung, which were revealed in this case by the post-mortem examination, showed that the disease had not, in the first instance, been simply bronchitis. At some long antecedent time, probably coincident with the first attack of bronchitis, five or six years before death, the patient had evidently suffered from extensive pleurisy of the left side, and also from a more limited pleurisy of the right side. On this latter side the inflammation would seem to have spread inwards, along the interstitial connective tissue of the lungs, producing the consolidation of the neighbouring lung-substance and also the white fibrous bands with which the lung was intersected.

But, although it was unquestionable, from these appearances, that pleurisy had existed at some previous time, the bronchitis and emphysema not only

were the most important, but had certainly been, for a considerable period before the man's death, the only active pulmonary ailments.

As I have pointed out to you on many occasions, some persons have repeated attacks of severe bronchitis without the appearance of any symptoms of pulmonary emphysema, whilst, in other persons, emphysema becomes developed as a consequence of comparatively mild bronchitis. In this latter class of cases there must undoubtedly exist a special predisposition to emphysema, consisting in a loss of tone in the walls of the air-vesicles, which disables them from resisting even moderate degrees of distension.

This I regard as having been the condition of lungs in the patient whose case we are now considering. In whatever degrees, respectively, the man's intemperate habits and the chronic inflammation spreading inwards from the pleura had combined to damage the nutrition of the lungs, the result had been such a predisposition to emphysema, that it had become developed to a very great extent in the right lung, and to a considerable extent in the left lung also; although, until his last illness, the patient had never suffered severely enough from bronchitis to have been laid up by it.

I may observe, by the way, that this case is one of many that have fallen under my observation which appear to me to afford conclusive evidence against the theory that pulmonary emphysema is, for the most part, the mechanical result of collapse of one portion of the lung and of complementary distension of other

portions to fill the vacant space. There was, it is true, an inconsiderable degree of collapse, or rather contraction, of the consolidated part of the right lung, but the volume of the remainder of the lung was increased enormously beyond its natural size, and out of all proportion to the diminution in bulk of the contracted part; and this would certainly not have occurred if the emphysema had been merely the result of complementary expansion.

The enlargement of the heart was chiefly due to hypertrophy of the wall, and dilatation of the cavities of the right side, which had reached such an extent that the wall of the right ventricle was almost as thick as that of the left, and the apex of the organ was formed by the right ventricle instead of by the left. The left side of the heart, however, was also somewhat hypertrophied, though in a comparatively small degree. The hypertrophy had obviously originated on the right side, as a direct consequence of the impediment to the circulation of blood through the lungs created by the bronchitis and emphysema.

The first result of this impeded entrance of the blood into the pulmonary capillaries would necessarily be, as I have explained on former occasions, its retarded flow out of the right ventricle, leading to over-distension of that cavity, and subsequently also of the auricle on the same side. This over-distension would excite the ventricle to increased activity: and hence, in accordance with the law that the size of muscles increases in proportion to their exercise, the

right ventricle had eventually become so much hypertrophied.

Each successive attack of bronchitis would, by aggravating the pulmonary obstruction, tend for the time of its duration still more to overload the right cavities of the heart with blood; until at length their walls would yield to the distension and dilatation would take place, as it has done in the case before us. Accordingly our patient stated that, during each successive attack of bronchitis, he had suffered more and more from dyspnoea and latterly also from palpitation; symptoms which were indicative of the progress of both the emphysema and the heart disease.

The history of this patient thus shows as clearly the process by which bronchitis often produces disease of the right side of the heart, as the cases I read to you in my last lecture showed the process by which disease of the left side of the heart may produce bronchitis.

We now come to our second case of bronchitis followed by heart disease, that of the female patient who died the other day in Northumberland ward. Discharged prematurely by her own desire shortly after her first admission, and being probably, from her intemperate habits, careless of herself, she took cold and returned to the hospital, after an absence of seventeen days, in a much worse state than when she left it, and with, as you remember, pleurisy superadded to her other ailments. Her case had, indeed, from the

first been beyond the reach of all but palliative treatment, but her life might possibly have been much prolonged had she remained to profit by the good food and nursing, as well as the rest and shelter from exposure, which she could enjoy in the hospital.

CASE XLV.—Amelia P. aged thirty-eight, a married woman of intemperate habits, was admitted into the Middlesex Hospital under my care on September 30. She stated that there was no constitutional tendency to disease in her family and that she had herself, until lately, been a healthy woman. She had not suffered from either gout or rheumatism in any form.

About eight months before her admission she had taken cold, which gave rise to a chronic cough attended, from the first, by much shortness of breath on exertion and by frequent orthopnoea at night. The expectoration had varied in character, being sometimes frothy and at other times thick and opaque, but it had never been mixed with blood. Four months before her admission she was suddenly seized on awaking one morning, with palpitation of the heart, from which she had ever since continued to suffer on making the least exertion and especially on going upstairs. Her cough and other ailments had much increased during the last seven or eight weeks. The urine had been high-coloured and usually scanty throughout her illness, and it had often deposited a red sediment.

On admission she complained chiefly of dyspnoea and palpitation, and of a sense of tightness in the chest. Even the slight exertion of walking across the ward brought on extreme breathlessness with a sense of choking. Her hands and feet were cold. There was no œdema of the lower extremities and no lividity of countenance. The urine had a specific gravity of 1020 and contained about a fifteenth part of albumen. The respirations were 42 in a minute, the pulse was 130, and the radial arteries were somewhat tortuous and rigid.

Her breathing was laborious, the accessory muscles in the neck being brought into powerful action. The veins of the neck were turgid; they pulsated in a very marked degree, and, on the interruption of the supply of blood from above, they filled rapidly by a wave from below. Pulsation was also readily distinguishable in the veins at the bend of the elbow. The chest was abnormally resonant on percussion over the whole front, from the clavicle to the margin of the ribs, excepting in the region of the cardiac dulness; it was also very resonant posteriorly. Sibilus and rhonchus were audible over both lungs, the respiration was harsh and expiration much prolonged.

The area of cardiac dulness was much increased, extending from the fourth to the seventh rib in a vertical direction, and from half an inch outside the left nipple to the left border of the sternum in a horizontal line. The cardiac impulse was diffused and heaving. The apex-beat was most distinct in the

sixth costal interspace, an inch on the outside of a line drawn vertically through the nipple, but the heart's impulse was also both seen and felt at the margin of the ribs on the left side, and, though much more faintly, over the intervening space. A distinct thrill was felt with the impulse on applying the flat hand over the apex of the heart. There was likewise tenderness on pressure over the præcordia. The heart sounds were clear; the first was somewhat prolonged and the second accentuated.

I prescribed the compound squill draught with ten minims of tincture of stramonium and twenty minims of tincture of henbane to be taken every six hours. A linseed meal poultice was applied over the back of the thorax and ordered to be renewed from time to time. The patient was put upon a nourishing diet with half an ounce of brandy every six hours.

On October 1, we found that she had suffered all night from orthopnoea, and at the time of visit she was sitting up in bed, leaning forwards and somewhat inclined towards the right side. She had frequent abortive cough with scarcely any expectoration. The respirations were less frequent, being thirty-two in a minute, but the breathing was laborious and the lower ribs and epigastrium were retracted during inspiration. Crepitation was audible in the bases of both lungs posteriorly.

Next day she was expectorating more freely a frothy sputum and, being still much distressed at night, was ordered to take at bed-time five grains of

the compound pill of hemlock with a quarter of a grain of hydrochlorate of morphia.

On October 7, she reported herself as much better. Her pulse was 108 and her breathing manifestly easier; the respirations were 30 in a minute. No sibilus nor moist sounds were audible; rhonchus was still heard. She was discharged this day, at her earnest desire, on account of urgent business matters.

On October 24, she was re-admitted into the hospital. Her aspect was now distressed and anxious, her breathing laboured, short and gasping, and she had constant orthopnoea. She complained much of pain and tenderness in the epigastrium. Her cough was frequent and abortive, the expectoration scanty, glairy and tenacious. Sibilus and rhonchus were heard over the greater part of both lungs. Pleuritic friction sound was perceptible below the right nipple, extending round to the scapula, and also over the centre of the left scapula. There was deficient resonance on percussion in the right mammary region and over both scapulæ.

The area of cardiac dulness was even greater than it had been before the patient left the hospital, and the heart's action was violent and irregular. The heart lay, as before, almost horizontally across the chest, its heaving impulse being plainly visible from the epigastrium to a full inch outside the nipple line.

The pulse was 100, feeble and irregular. The tongue was furred and the appetite bad. Very considerable œdema of the lower limbs and trunk had



become developed. The urine had a specific gravity of 1020, and contained a very large proportion of albumen.

I ordered her to take, every four hours, a draught containing ten minims each of spirit of chloroform and tincture of stramonium, twenty minims of tincture of henbane, and an ounce and a half of camphor water, and also two pills at night, consisting of four grains each of camphor and extract of henbane, to be followed in the morning by two scruples of compound jalap powder. A linseed meal and laudanum poultice was applied over the epigastrium.

It was sufficiently evident that the patient had not only lost ground generally during her absence from the hospital, but that pleurisy as well as bronchitis now existed in both lungs. Accordingly she became rapidly worse. The dyspnoea became more urgent and the breathing more hurried.

On October 29, there were 60 respirations in a minute. The respirations were not only extremely frequent, but they were also peculiar in character. Several short, gasping, ineffective inspirations seemed to follow each other with great rapidity; and, the expiration being equally incomplete, she suffered at times from paroxysms almost of apnoea, during which the laryngeal muscles were brought into spasmodic action. These rapid respirations were followed at irregular intervals by a fuller, deeper, sighing inspiration, which afforded momentary relief.

She now complained frequently of faintness and of

a sense of choking. The urine showed an increase in the proportion of albumen to fully one-third of its bulk, and exhibited, under the microscope, an abundance of mucous corpuscles and hyaline casts, together with a few cloudy epithelial casts. She died on the 6th, of the present month (November).

At the post-mortem examination fluid was found in both pleural cavities. The right pleural surfaces were covered with lymph, which was beginning to form adhesions. There was also a patch of rough lymph about the middle of the posterior surface of the left lung, which corresponded with the seat of a large patch of pulmonary apoplexy. In the upper and lower lobes of both lungs, there were numerous patches of pulmonary apoplexy of recent origin. Both lungs were very voluminous and generally emphysematous, but neither presented any distinct bullæ. The bronchial tubes were much injected and contained bloody mucus.

The serous surfaces of the pericardium and heart were normal. The heart was much enlarged, weighing nearly 20 ounces, but was nevertheless overlapped and almost concealed by the still more enlarged lungs. The position of the heart was transverse, its apex being tilted upwards. The right cavities were very largely dilated. The tricuspid and mitral valves were slightly thickened; the pulmonary and aortic valves were normal and competent. The walls of both ventricles were much thickened. The liver was enlarged and presented the so-called nutmeg appearance.

The kidneys were of moderate size, their capsules adherent, their surfaces red, very granular and studded here and there with small cysts. On section the cortical parts were found to be somewhat wasted.

Although I have read you this case on account of the hypertrophy and dilatation of the right side of the heart, consequent upon the bronchitis and emphysema, the history discloses other serious lesions of important organs, which cannot be passed over without notice.

The case was, in fact, a very complicated one. Not only was there considerable hypertrophy of the right ventricle with large dilatation of the right auricle and ventricle, but the left ventricle was also much hypertrophied. The liver was much diseased; the kidneys were granular; and, lastly, judging from the well-marked rigidity of the radial arteries, the arterial system must have been generally diseased and inelastic.

It is, I consider, quite impossible that all these morbid changes should have taken place during the short period assigned by the patient to the duration of her illness. She stated that she had been in good health until her first attack of bronchitis, eight months before her admission; but the disease in the arteries and kidneys had certainly, in my opinion, been of considerably older standing.

Whether the arterial or renal disease had been the primary one, is a question irrelevant to our present

subject. The original cause of both diseases I believe to have been the woman's confirmed intemperance, and their existence fully accounts for the hypertrophy of the left ventricle. They had, however, crept on so insidiously, that the patient was actually unaware that she was falling into ill-health until she began to suffer from bronchitis.

In this respect, indeed, the case is by no means an uncommon one; for bronchitis, often becoming established in persons who up to that time have been in apparent health, does in many cases seem to be primary, until some other disorder, which has been coming on imperceptibly for months or years past, is brought to light by the aggravation of its symptoms induced by the pulmonary obstruction.

As regards the origin of the pulmonary disease in this patient, the nutrition of the lungs had doubtless been impaired both by her intemperate habits and also by the renal and arterial diseases to which these had given rise. Hence would proceed, not only a predisposition to bronchitis, but, also, such a loss of elasticity in the walls of the air-cells as would incapacitate them from resisting the strain brought to bear upon them in coughing. And thus, in the end, a common cold, contracted only a few months before death, developed at once into severe chronic bronchitis; which, in its turn, produced with great rapidity extensive emphysema and large dilatation of the right cavities of the heart.

But, although this case was thus a much more

complicated one than that upon which I commented previously, the relation between the bronchitis and the hypertrophy and dilatation of the right side of the heart is identical in the two cases.

The same observation applies to a very interesting case that was, several years ago, alternately under the care of Dr. Thompson and myself, and in which there was enormous dilatation of the right cavities of the heart. The case is, in that and other respects, of so remarkable a character that I shall make no apology for reading it to you, although none of you can have seen it.

CASE XLVI.—Joseph H., aged twenty-six, blacksmith, was admitted an out-patient of the Middlesex Hospital under my care on March 20, 1863. His father had died of heart-disease and dropsy, but there was no history of phthisis in the family. The patient had never suffered from rheumatism, but he had for some years been subject to palpitation of the heart, which had come on so gradually that he could not fix any date for its commencement. He had also, for several years, suffered more or less from cough in winter and spring; and, about a year previous to his admission, he had had an attack of hæmoptysis, since the occurrence of which he had steadily declined in health.

At the time of admission he had much cough and expectoration. His complexion was very pallid; his skin was hot; voice raucous; pulse 90. A loud

systolic murmur was heard below the left nipple and also in the axillary region. There was dulness on percussion over both infra-clavicular regions, especially the left. Cavernous respiration with gurgling was heard in the apex of the left lung, coarse crepitation in that of the right lung. He was ordered to take the nitro-hydrochloric acid draught, with wine of ipecacuanha and tincture of henbane, three times a day, together with a tea-spoonful of cod-liver oil.

On April 4, the cough was much relieved and the patient felt better, but the pallid complexion and the physical signs remained as before. A draught containing twenty minims each of the tinctures of digitalis and perchloride of iron was now substituted for his former medicine, and he was desired to take two tea-spoonfuls of cod-liver oil with each dose.

On May 3, he reported himself as much better, and as having gained strength enough to return to his work. His weight was 124 pounds. He was ordered to continue the cod-liver oil with a drachm of syrup of iodide of iron, three times a day.

Under this treatment he decidedly improved; his weight increased up to 130½ pounds; the cough and expectoration greatly diminished, and he was able to continue at work for several months.

On October 30, he presented himself after a longer interval than usual, suffering from bronchitis throughout both lungs. The bronchitic sounds were so loud as to mask both the mitral murmur and the phthisical signs. The lips were purple and the whole

face had a livid hue. Anasarca supervened in the course of a few days, the integuments of the chest became œdematous, and, being quite unable to continue his attendance as an out-patient, he was admitted into the hospital on November 10, under the care of Dr. Thompson.

At that time his pulse was 120, small and weak; the respirations were 40 in a minute and very irregular. His face and lips were livid and much swollen. The percussion-note was full and clear over the right side of the chest anteriorly, dull and tympanitic over the left side. The area of præcordial dulness was much extended in every direction. No valvular murmur was heard. Under the left clavicle there was bronchial breathing, accompanied by moist sounds of a sharp and almost metallic character. Over the remainder of the chest rhonchus and sibilus were everywhere audible.

On November 14 his face was dusky and he had frequent loose cough, attended by a frothy, mucopurulent expectoration. His pulse was 112, weak; the respirations were 52, chiefly diaphragmatic.

On the 19th the œdema had increased. A loud systolic murmur was again heard, two inches below the nipple and one inch to the left of the sternum. The external jugular veins were turgescient and beaded.

From this time he sank rapidly, and died on November 28.

At the post-mortem examination the body was

found to be generally well-nourished, but very œdematous. The face was livid and bloated. The lungs were both very voluminous and firmly attached to the ribs by old adhesions; they were emphysematous in front, but their posterior parts were congested.

In the apex of the right lung there were three cavities, the largest about the size of a walnut. Of these cavities, two were empty, with smooth inner surfaces, having the appearance of being lined with a delicate membrane; the third cavity was filled with a semi-solid cheesy substance, presenting all the characters of old tuberculous deposit. In the apex of the left lung, close to its anterior surface, there was a cavity exactly resembling the empty ones in the right lung, but of rather larger size. None of these cavities communicated with any of the bronchial tubes. The bronchial tubes throughout both lungs were uniformly dilated.

Microscopical examination showed that the cavities were not lined with epithelium, but that the walls were formed of fibrous and elastic tissue, which could not be distinguished from the surrounding condensed pulmonary tissue.

The heart was of very large size; the right cavities being enormously dilated and the left cavities considerably so. The tricuspid opening would admit four fingers with ease. The wall of the right ventricle was three lines in thickness at the base. The tricuspid and pulmonary valves were normal. The mitral valve was somewhat thickened at the margin



and had a row of minute vegetations on the auricular surface; the orifice was of normal size. The wall of the left ventricle was six lines in thickness at the base.

The liver was rather small and presented a slightly nutmeg appearance. The kidneys were somewhat large and congested.

This case therefore, as you have heard, was also a very complicated one. The man had long been subject to palpitation and to winter cough. When he first came under my observation in March he was manifestly suffering from incompetence of the mitral valve and from active phthisical disease in both lungs. At that time there was no evidence of the presence of any considerable degree of emphysema, which, however, became developed afterwards with great rapidity; for, on my re-examining him eight months later, the dulness on percussion below the right clavicle observed at his first examination, had given place to abnormally clear resonance.

Meanwhile, the phthisical symptoms had gradually abated, and the patient had gained flesh to such an extent, that Dr. Cayley, in his notes of the post-mortem examination, reports the body to have been well-nourished.

On the first approach of cold weather, however, he had again been attacked by bronchitis, which now, in conjunction with the emphysema, had so impeded the flow of blood through the lungs, and consequently

through the right side of the heart, as to produce large dilatation of its cavities, and give rise to the venous congestion which was evidenced, during life, by the lividity of countenance, and by the anasarca and œdema.

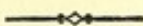
I must advert, lastly, to a point of very striking interest in the case. Several eminent authorities, and amongst them Rokitansky, have supposed that the venous condition of blood which exists in emphysema is antagonistic to the development of phthisis. Whether any relation of cause and effect existed, in this case, between the development of the emphysema and the simultaneous arrest of the previously active phthisical disease, I am not prepared to decide; but the post-mortem examination certainly revealed one of the most remarkable examples of almost cured phthisis which has ever fallen under my observation.

Of the three cases I have read to you to-day, the first, only, exemplifies the relation between chronic bronchitis and disease of the right side of the heart in its simple form. The second and third both belong to the much more numerous class of cases, in which the pulmonary and cardiac lesions are complicated with other serious diseases, which have preceded, and at least contributed to produce, the bronchitis.

You must bear in mind, however, in conclusion, that it is a matter of no moment, with respect to the causation of disease of the heart by bronchitis and

emphysema, whether the bronchitis be primary or secondary ; or, if secondary, from what cause it may have originated. Provided that it produce sufficient obstruction to the flow of blood through the lungs, it must tend to cause hypertrophy and dilatation of the right side of the heart ; though it rarely does so, I think, to any great extent, unless associated with emphysema.

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