On winter cough, catarrh, bronchitis, emphysema, asthma : a course of lectures delivered at the Royal Hospital for Diseases of the Chest / by Horace Dobell.

ON
WINTER COUGH

Dr DOBELL

THIRD EDITION

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PRESENTED BY

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M.B.

November 24th 1904.

Dr R Shingleton Smith
With the author's kind regards

ON

WINTER COUGH,

CATARRH, BRONCHITIS, EMPHYSEMA, ASTHMA:

A COURSE OF LECTURES

DELIVERED AT THE

ROYAL HOSPITAL FOR DISEASES OF THE CHEST.

BY

HORACE DOBELL, M.D.,

SENIOR PHYSICIAN TO THE HOSPITAL,
ETC., ETC

THIRD AND ENLARGED EDITION, WITH COLOURED PLATES.

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DEDICATED

TO

MY COLLEAGUES AT THE ROYAL HOSPITAL FOR DISEASES OF THE CHEST,

FELLOW-WORKERS IN THE SAME FIELD,

AS A SLIGHT TOKEN

OF

GOOD FELLOWSHIP AND PERSONAL REGARD.

PREFACE TO THE THIRD EDITION.

Less than three years having elapsed since the publication of the last edition of this book, when I not only revised it with great care, but recast the work, introducing two new lectures, a copious index, and other substantial additions, I have thought it advisable, in producing this Third Edition, to disturb the arrangement of the contents as little as possible. At the same time I have done my best to increase the interest and usefulness of the book by copious annotations under the head of Treatment and in the form of an Appendix, and by the addition of an entirely new Introductory Chapter.

In publishing the latter I may perhaps be thought to have been somewhat venturesome, seeing the fragmentary nature of the knowledge on which it is based and the extremely hypothetical character of the suggestions I have brought forward. But some venturesomeness is, I think, not only allowable but necessary, when the object is not to dogmatise but to excite thought and promote discovery in regions almost unexplored.

84, Harley Street,
November, 1874.

PREFACE TO THE SECOND EDITION.

I REGRET that my professional engagements have made it impossible for me to comply sooner with the demand for a new Edition of this Work, and that I have been compelled to allow it to remain so long out of print.

Out of respect for the favourable reception of the first Edition, I desired that the second should be something more than a reprint, otherwise I might have re-issued it at once. I have now done my best thoroughly to revise the text, and to take advantage of such suggestions as I have received from my reviewers and friends. I have added two new Lectures—one "On the Natural Course of Neglected Winter Cough, and on the Interdependence of Winter Cough with other Diseases"; the other "on Change of Climate in Winter Cough." Fresh matter has been inserted under the heads of "Ear Cough," "Post-nasal Catarrh," "Laryngoscopy," "Artificial Respiration," and "New Instruments and Methods of Treating Emphysema of the Lungs." In addition to this, I have introduced Coloured Plates of some of the principal pathological conditions met with in Winter Cough, and to these I

have appended concise statements of the signs by which they are indicated during life. Finally, I have given a complete index prepared by the best index-maker in London.

I desire particularly to thank those friends who have assisted me in my work; especially my excellent colleague, Dr. Crucknell, for some critical suggestions; Dr. Biddle, of Kingston-upon-Thames, for pointing out an arithmetical error in Table II. (now corrected), which had escaped the vigilance of other critics; and Dr. T. More Madden, of Dublin—who has had so much experience in travelling for health—for his assistance in revising the list of health resorts in Lect. IX.

In conclusion, I cannot let this opportunity escape of expressing my extreme regret at finding how large a number of my professional brethren are themselves sufferers from Winter Cough, at the same time that I am deeply sensible of the compliment they have paid to my work, when they have been led through it to consult me about their own complaints. Nothing has more strongly stimulated me to make this edition as practically useful as possible than the hope that I may thus still further aid them in dispelling from their own homes so unwelcome an intruder as a Winter Cough.

84, Harley Street,
March, 1872.

PREFACE TO THE FIRST EDITION.

I THINK it must be admitted that those who have trained their minds to observe correctly and to form conclusions cautiously, cannot pass through a large experience without acquiring wisdom in matters which relate to that experience. Yet such persons, if called upon to prove that their wisdom is the result of sound conclusions based upon a sufficient number of unquestionable facts, may be quite unable to do so to the satisfaction of others. The facts which have been carefully stored up in the mind, like the centrings of a builder's arch, until the conclusions which they support have become ripe, are then allowed to slip away one by one from the memory, and others are accumulated as the basis of fresh conclusions, to disappear again in their turn. The wisdom which remains as their fruition is like the seeds gathered together in a granary; it bears no proof of how or whence it came, until some sower has again gone through the process of rearing fresh plants to maturity and winnowing out fresh seed.

This, indeed, is that unwritten wisdom which is the

peculiar property of the sage. That it cannot be transferred or transmitted to others is, perhaps, the chief cause of the slow advance of intellectual progress from age to age. The tendency of the world has been to disregard "authority" in proportion as the means and facilities of recording facts have multiplied; so that, in the present day, the wisdom of the sage, if unsupported by the record of his experience, is scarcely valued at the price of the hasty conclusions of a novice, who may have picked out and recorded a few facts by which they seem to be supported. The danger of this tendency is, that society may drift into the disbelief of everything; for, if we first disbelieve in every conclusion which is not supported by recorded facts, that is to say, if we disbelieve in the opinions of wise men unless the whole course by which they arrived at those opinions be demonstrated, the next step is to doubt the correctness of all recorded facts, however good the authority of the recorder; and thus, when the demonstration has been given, to doubt its correctness still.

Nevertheless, there is wisdom in this incredulity, if kept within proper bounds. Though it may apparently retard the progress of truth, if the steps that we are permitted to take are made more secure by being taken slowly, our advancement will be quicker in the end. It is, then, our unquestionable duty neither to disregard the opinions of wise men, nor to neglect, so far as we are able, to

record our own observations as we go along; so that our own conclusions and our future wisdom may have less danger of meeting with disbelief, and of thus proving useless to the world. The great difficulty in this busy life is for men, like ourselves, who have to earn their living by their professional labours, to find the time to do that which they well know to be best, and which they most desire; for, in proportion as their opportunities of observation increase, the possibility of recording observations diminishes, and so, I fear, it must always happen that much of the wisdom of our greatest physicians will die when they die.

The foregoing remarks are applicable to these lectures to this extent—that the number of cases which I have here recorded, and which, therefore, appear as the bases of my conclusions, is really absurdly small as compared with the number of similar cases which, during many years' experience at the Royal Hospital and in private practice, have been quite as carefully observed, and have only failed to be recorded because all the available time was spent in examining them with care.

I must point out one important fact in relation to the cases here cited, viz., that they were taken with the utmost fairness as to the conclusions they might justify, no one point having been set before the mind at starting on which to acquire proof or disproof. A simple and open enquiry was pushed into the facts of the cases, to

yield what results it might. My conclusions have been forced upon me as the unavoidable results of this enquiry; but, as all probable evidence is subject to the contingency of having a variable weight in different minds, what has seemed most clearly proved to me may to others appear in quite a different light.

84, Harley Street,
January, 1866.

Fig 1.

Fig 2.

PLATE I.—*Fig.* 1.—SECTION OF LUNG.—*Second Stage of Bronchitis in large and medium-sized tubes.*

Bronchial mucous membrane red and tumid. Exudation in the bronchi. Rhonchal fremitus occasionally felt over large tubes.

PERCUSSION, usually normal, but resonance may be slightly increased or slightly impaired.

AUSCULTATION: vesicular murmur impaired. Both respiratory sounds harsh, accompanied by crepitation of different sizes*, and by rhonchus and sibilus. Expiration prolonged and high pitched, in proportion to the amount of tube-obstruction. Inspiration of lower pitch than expiration, unless there is asthmatic spasm combined with the Bronchitis (*See* Lect. III., p. 60).

COUGH gets loose as exudation increases, may be loud, hoarse and occasionally paroxysmal.

SPUTA, at first viscid and frothy, becoming ropy, yellowish or greenish, or deep grey, usually running together, sometimes in opaque pellets, occasionally streaked with fine threads of blood.

* In Capillary Bronchitis, crepitation may be so minute that care is needed not to mistake it for the pure "fine crepitation" of Pneumonia; but "fine" crepitation accompanies the inspiration only, the minute crepitation of Capillary Bronchitis accompanies both expiration and inspiration.

PLATE I.—*Fig.* 2.—SECTION OF LUNG.—*Chronic Bronchitis.*

Thickened and indurated vascular bronchial mucous lining. Venous congestion. Exudation in the Bronchi.

PHYSICAL SIGNS, essentially those of the second stage of Bronchitis, but usually respiration is more laboured, especially in expiration, the expiratory sounds are more markedly prolonged and high-pitched (*See* Lect. III., p. 60).

SPUTA, less aërated and of more nauseous odour; occasionally (Bronchorrhœa) copious, watery, glairy, bubbling fluid accompanies paroxysmal cough.

In this stage, signs of localised disintegration of lung-tissue or of bronchiectasis (*Fig.* 3) are often combined with those of Bronchitis, and require care for distinctive diagnosis (*See* Lect. VI., p. 150, and Lect. VII., p. 158).

PLATE II.—*Fig.* 3.—SECTION OF LUNG.—*Bronchiectasis.*

Bronchi dilated, cylindrical, flask-shaped, sacculated, &c., containing secretion; surrounding lung condensed by pressure in the immediate neighbourhood of the tubes.

PHYSICAL SIGNS, closely resemble those of tuberculous excavations, but usual seat not nearer apex than second or third rib, and apex signs may be normal. Flattening of infraclavicular space less than in tuberculous excavation of similar extent. Vocal fremitus usually increased. Rhonchal fremitus increased in proportion as the dilated tube is large and near the chest-wall, often very marked.

PERCUSSION, varies with the extent and amount of lung condensation round the affected tubes, the size of the dilated tube, its distance from the chest-wall, and the amount of secretion in the tube; usually there is more or less dulness; if dilatation is considerable and surrounding lung much condensed and near the chest-wall, percussion will be tubular or amphoric, but will differ according as the tube is empty or full of secretion.

AUSCULTATION: crepitation rising in size with that of the dilatation from large mucous crepitation to medium-sized cavernous gurgle, usually combined with rhonchus: sounds may be dry, simply harsh, or rhonchal.

SPUTA, usually abundant, purulent, solid, offensive, often long retained, and expelled in paroxysms, fœtid in proportion to the length of retention. If uncomplicated with tubercle, heart-disease or lung-disintegration, not mixed with blood. (*See* Lect. VI. p. 150 and VII. p. 158.)

PLATE II.—*Fig.* 4.—SECTION OF LUNG.—*Emphysema.*

Enlarged air cells with attenuated anæmic walls; in some places contiguous cells have coalesced through distension of the cell-walls. The attenuated cell-walls often degenerated. (*See* Lect. VI. p. 149.)

Chest, distended, rounded, especially in front superiorly and behind inferiorly; elevation greatly in excess of expansion, duration of expiratory movement excessive; dyspnœa essentially persistent, subject to paroxysmal aggravation.

PERCUSSION, unaltered by respiration, morbidly clear and low-pitched or tympanitic: sometimes—when cell distension, expiratory obstruction and elastic resistance, are all excessive—percussion has the peculiar high pitch of an over-distended bladder, and may be incautiously mistaken for dulness. Area of resonance extends beyond the normal limits.

AUSCULTATION: sounds differ according to the co-existence or not of obstructed expiration from thickened tubes (*See* Lect. III., p. 59 and signs of *Fig.* 1 and 2), or of asthmatic spasm (*See* Lect. III., p. 60); when neither are present, inspiration feeble, short, low-pitched; expiration feeble, long, and very low-pitched (*See* Lect. III. pp. 67, 69), often, in extreme cases, free from Bronchitis, respiration scarcely audible. Bronchitis is so frequently co-existent that rhonchus, sibilus and crepitation commonly mask all other sounds. Heart's sounds and impulse epigastric.

COUGH, not essential (*see* p. 110), but usual in consequence of complications; then convulsive, suffocative.

SPUTA, frothy, liquid, mucous, usually accompanied with sputa of Bronchitis, (*Figs.* 1, 2).

Fig 3.

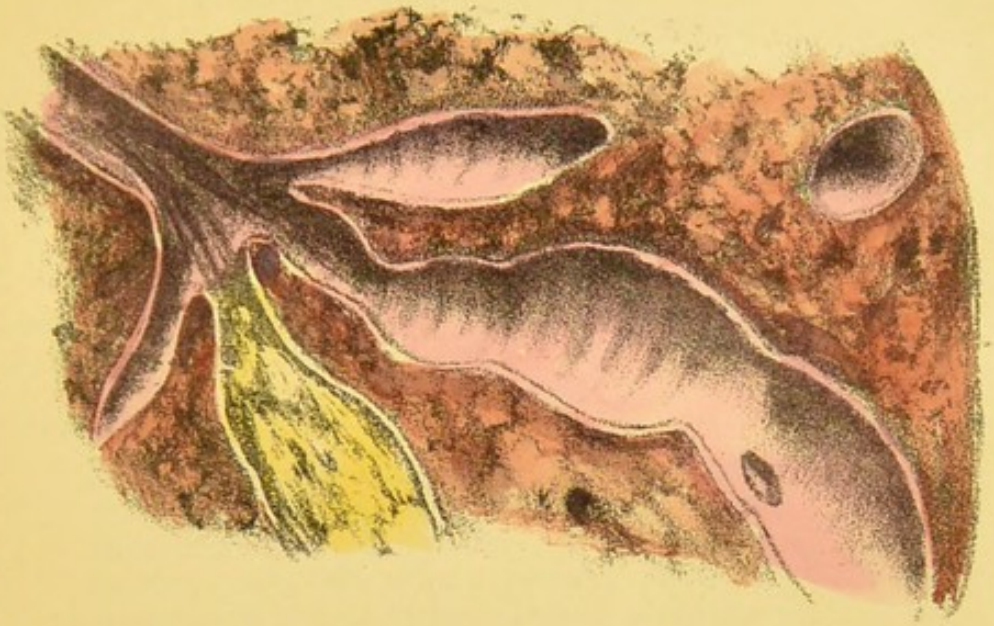
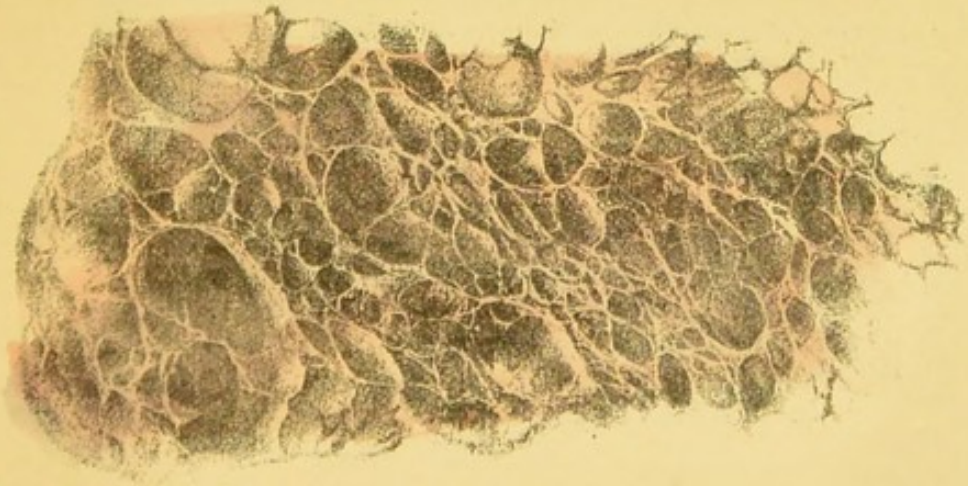


Fig 4.



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All Cases not included in the Tables are marked with an asterisk.

The COLOURS are only used as distinguishing marks of the several groups, to avoid the needless repetition of definitions in the Tables.

As all the salient points of the Tabulated Cases are contained in the Tables and abstracts given in the Lectures, the further details have been omitted; because they would have added twenty-five pages of Tabular matter to the Work without equivalent advantage.

GENERAL DESCRIPTION OF THE FIVE CLINICAL GROUPS REFERRED TO PAGE 4, WITH THE NUMBERS OF THE CASES INCLUDED IN EACH GROUP.

GROUP I.—YELLOW.—*Physical signs of Emphysema and not of Bronchitis:* no history *of previous Bronchitis.*

1 Case—No. 20.

GROUP II.—BLUE.—*Physical signs of Emphysema and not of Bronchitis:* history of previous *Bronchitis.*

6 Cases—Nos. 1, 7, 19, 48, 53, 57.

GROUP III.—RED.—*Physical signs of Bronchitis, and not of Emphysema.*

18 Cases—Nos. 3, 10, 12, 13, 16, 18, 21, 25, 29, 32, 36, 37, 39, 43, 45, 49, 54, 60.

All the 58 Cases are referred to in the Genealogical Tables, pp. 138-41.

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ERRATUM.—P. 200 note, *for* Tongue-sucking *read* Thumb-sucking.

INTRODUCTION.

ON THE PERIVASCULAR SYSTEM AND ITS RELATION TO DISEASES OF THE RESPIRATORY ORGANS.

Deep, unnumbered, and unseen, insinuated among the structures of every tissue and organ of the body—inter-associating the red-blood circulation, the molecular changes of matter, the lymphatics, the serous and mucous membranes, and the secreting glands,—co-extensive with the vascular system itself; there exists a wonderful meshwork of lacunæ and channels by which the whole organism is irrigated with nutrient but colourless blood. This is the Perivascular System of Canals.

Although the existence of this system has been placed beyond doubt by recent discoveries, it is scarcely yet entered on the Tables of Science.

In my opinion the greatest work now open to physiologists, pathologists, and physicians, is to bring the Perivascular System within the area of our daily interpretations of the Phenomenon of Disease, and thus to suggest new means of treatment in cases hitherto beyond our control.

In order to further this object, I proposed last year to offer a Prize for Original Anatomical Observations and Physiological Experiments connected with the Perivascular System of Canals. I was dissuaded from carrying out this intention by Professor Flower and other friends whom I consulted, whose experience in prizes offered for such objects was decidedly adverse to their success. The Calendar of the Royal College of Surgeons shows how many valuable prizes have been offered by that splendid institution with the disappointing result that "no dissertation was presented."

Having thus abandoned, with regret, the hope of securing what I desired by a prize, and having no leisure at my disposal to make the necessary investigations myself, I have now chosen this subject for my Introductory Chapter, in the hope of stirring up those younger men who have time to spend in Anatomical dissection-rooms, Physiological and Chemical laboratories, and in those other arenas of clinical and scientific study afforded by our great modern Schools of Medicine, to lose no opportunity of placing in the hands of practising physicians and surgeons more extended and more accurate knowledge on this intensely interesting and important subject.

In the foot-notes I have collected such fragments of information concerning the Perivascular System as I have been able to find scattered through various publications; and although doubtless some others exist, those that are here given will I think fairly indicate the amount and the poverty of our present knowledge.[1]

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[1] RANVIER. "*Des Eléments cellulaires des Tendons et du Tissu conjonctif lâche.* Archives de Physiologie, 1869."

Abstract by Professor Villemin. Dr. Dobell's *Reports*, 1870, p. 4.

"The stellate figures (plasmatic cells of Virchow) are nothing else than the meshes of the network of the bundles of fibres. We do not say that there is no plasmatic circulation in the connective tissue. There is probably a circulation round the connective bundles in the highly dilatable spaces which they leave. The presence of cells similar to the white corpuscles of the blood, or to those of the lymph, leads one to think with Recklinghausen, that the plasmatic circulation is a true circulation of lymph. Besides, the existence in the subcutaneous areolar tissue of these cells, lying on the surface of the bundles, inclines us to regard the connective tissue as a vast enclosed space, analogous to the serous cavities."

DR. STRICKER (Robin's *Journal*, 1867, p. 652*) describes the *structure and origin of capillaries.* He confirms the existence of PERIVASCULAR SPACES around the capillaries, as His and Robin had previously described in the

* "Ces préparations ont permis à M. Stricker de constater l'existence des espaces périvasculaires, autour des vaisseaux capillaires. Ces espaces périvasculaires ont été observés plusieurs fois au moyen des injections, et la première fois sans injections, par M. Robin, sur les capillaires de l'encéphale."—ROBIN'S *Journal de l'Anatomie et de Physiologie*, 1867, p. 652.

And now, to give a practical turn to my remarks and to bring them home to the subject of these Lectures, I will

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brain, and Lightbody in the cornea, in Humphrey and Turner's "Journal of Anatomy and Physiology," Nov., 1866. He concludes that the capillary walls are formed of protoplasm.

Dr. Albert Carter, Humphrey and Turner's *Journal of Anatomy and Physiology*, 1870, pp. 97—117, and *Proceedings of Royal Society*, 1864.

"From the time my first observations were made on this subject till now (1864), I have been engaged in accumulating further evidence of this communication (of the blood vessels with the lymphatics), and in doing so I have been led to the discovery of another system of vessels, not connected, apparently (as far as could be actually seen), with the lymphatics, but commencing and terminating in the capillaries, and resembling those before mentioned in being so minute as to admit of the passage only of the liquor sanguinis." . . . . .

"My researches would seem to justify the conclusion that such channels are common to all organs or tissues." . . "With regard to the offices performed by these fine tubular networks, I have for the present but little to say, except that I consider all those found in the epidermal or mucous tissues to be especially and peculiarly connected with the functions of secretion, and probably also, but in a minor degree with that of absorption; while those situated in the deeper parts of the organism such as muscle, fibrous tissue, &c., are employed in conveying blood, plasmatic, and effete matters from the tissues through which they run or with which they may be in contact."

New Sydenham Society's *Biennial Retrospect*, 1869-70, p. 11.

"In regard to the blood-vessels, T. A. Carter (*Journal of Anatomy and Physiology*, iv., p. 97) maintains that a communication may be observed between them and the lymphatics in almost all organs amongst amphibia and mammals, in the form of a very delicate plexus. . . Henle considers no satisfactory evidence of such a communication has been established."

Kirkes' *Handbook of Physiology*. Eighth Edition. 1872, p. 349.

"The lymphatic capillaries commence most commonly either in closely-meshed networks or in irregular lacunar spaces between the various structures of which the different organs are composed. The former is the rule of origin with those lymphatics which are placed most superficially, as for instance, immediately beneath the skin, or under the mucous and serous membranes: while the latter is most common with those which arise in the

proceed to an inquiry into the meaning and probable explanation of the following clinical phenomena. There has

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substance of organs. In the former instance their walls are composed of but little more than homogeneous membrane, lined by a single layer of epithelial cells, very similar to those which line the blood capillaries. In the latter instance, the small, irregular channels and spaces from which the lymphatics take their origin, although they are formed mostly by the chinks and crannies between the blood vessels, secreting ducts, and other parts which may happen to form the framework of the organ in which they exist, yet have also a layer of epithelial cells to define and bound them. . .

Rhindfleisch's *Pathological Histology*, Vol. i. p. 249, New Sydenham Society.

"On the other hand, I must remind the reader that the *vessels are continuous by their adventitia* with the general connective tissue of the organs—that, rightly understood, the walls of the vessels are really a part of that connective tissue, and are therefore capable of taking a most active share in all inflammations, however acute, of the various organs on which they ramify."

Anatomy of the Lymphatic System. I. The Serous Membranes. By E. Klein, M.D., 1873. Section 1. Normal Conditions.

"Since the important discovery of injecting the lymphatic vessels of the diaphragm from the peritoneal cavity by Rechlinghausen, and since this author has shewn that the serous cavities represent great lymphatic sacs, the serous membranes have become a favourite object of study. A long series of excellent researches has highly amplified our knowledge of the normal and pathological histology of the serous membranes in a relatively short time. The staining with solution of nitrate of silver, first employed by Rechlinghausen, plays a great part in this advance.

"As regards the normal conditions, the attention of histologists has been chiefly, if not wholly, directed to three questions:—1. The distribution of the lymphatic vessels in the serous membranes; 2. The origin of the lymphatic capillaries from the lymph-canalicular system of Rechlinghausen; and 3. The free communication between the lymphatic vessels and the serous cavities by means of stomata." P. 12.

"As regards the serous membranes, there cannot be the slightest doubt about the cellular elements of the ground-substance being more or less flattened branched-nucleated protoplasmic cells, and the lymph-canalicular system representing merely the spaces in the ground-substance for these cells; and I cannot agree by any means with the assertion of Schweigger-Seidel and Boll that the connective tissue corpuscles in general represent elastic plates which play only a passive part."—Note to p. 15.

"We have already stated that the larger patches (in the rabbit's

occurred within my experience, and I doubt not within that of other physicians, a certain number of cases characterised by the presence of these peculiar phenomena :[1]—

That the patient could not sleep without afterwards suffering from a profuse discharge of watery mucus (the water abundant, the mucous elements scanty) from the anterior and posterior nares, and of tears from the eyes, this discharge being preceded by a distressing sense of confusion, worry, irritability, and general hypersensitiveness of the whole brain, but especially of the posterior and upper parts, and accompanied by sharp flying pains through the brain, and not uncommonly by a peculiar liquified feeling, as though the brain had lost its density, but distinguishable from ordinary vertigo, or swimminess.

The fact of having *been to sleep* is, in these cases, the sufficient cause for the unpleasant effects above described, and for those yet to be mentioned. Neither the position in which

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omentum) are provided with a system of blood-vessels. Disregarding, at present, the exact details, we shall merely mention that this system consists of an afferent arteriole, efferent veins, and intermediate capillaries. Regarding, now, the lymphatic system of these patches, it is always to be observed that the efferent vein, more seldom also the afferent artery, is accompanied by at least one capillary lymphatic, or is even invaginated in one such. At the point where the vein becomes the capillary—that is, where it enters the patch—the lymphatic, as such, terminates, that is to say, its hitherto shortly defined wall and covering of sinuous endothelium ceases, and only the lymph canalicular system appears in its place.

"There can be no doubt whatever, if a favourable point is closely observed, that at the point the lumen of the lymphatic vessel on the one hand loses itself in reality in a labyrinth of spaces, which consist of lacunæ with uniting canals, representing the lymph-canalicular system; and, on the other hand, the endothelial plates of the lymphatic are continued as branched cell-plates. . . . . We call, therefore, these patches or nodules peri-lymphangial nodules," p. 36.

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[1] The facts here stated as typical of a class of cases have been especially observed with great care in the case of a medical friend and patient, whose symptoms have been accurately watched and noted for the last twenty years by both the patient and myself, and which therefore have afforded a most reliable standard with which to compare other cases as they occurred.

the sleep is taken, nor its duration are essential factors; although certainly they have some influence on the intensity of the symptoms—the more horizontal the position, and the longer the sleep, the greater the intensity of the effects; but they will occur although the sleep has been of short duration, and taken in a perpendicular position.

The above brain-symptoms are *premonitory* of the discharge of watery mucus from the anterior and posterior nares, and of tears from the eyes; but they are separated from it by a longer or shorter interval, during which they undergo a distinct change. The worry, irritability, etc., etc., gradually clear off, and are, sooner or later, succeeded by frontal and post-nasal fulness, as in the congestive stage of influenza or coryza. But this soon culminates in the profuse secretion and discharge. As a rule, the premonitory symptoms having once occurred, there is no escape from the second set of symptoms ending in the hypersecretion, and the profuseness and duration of the secretion bear a direct relation to the severity of the premonitory symptoms.

Occasionally, however, but very seldom, the second set of symptoms does not occur. The interval between the sleep and premonitory symptoms and the second set, or culminating symptoms, varies greatly in length; and as it is rare to be able to watch a case through more than twenty-four hours without the recurrence of sleep, the sequence of effects becomes confused by the repetition of the cause. But I have watched one of these cases through forced sleeplessness of forty-eight hours at a time, and found that the premonitory symptoms having once passed off without being succeeded by the second set, did not, as a rule, recur till sleep was repeated. I say "as a rule," because there are other circumstances besides sleep, in all of these cases, which will produce the characteristic succession of phenomena. All these circumstances, when closely investigated, may be classed under the head of *temporary determination of blood to the brain*, and this is a very important point.

The persons who suffer from the above symptoms are

especially liable to fits of *Asthma*;[1] and the principal antecedents of the asthmatic attacks are—1, Sleep; 2, Circumstances which may be classed as known causes of pulmonary hyperæmia, such as rapid exercise, etc. They are not always asthmatic, but they seldom escape. Sometimes a patient will remain "a sneezer,"[2] and escape asthma for years; sometimes he may almost cease to be a sneezer, and become an asthmatic for years; sometimes he may begin as an asthmatic, and then change into a sneezer. Sometimes, and this is most frequently the case, he is both a sneezer and an asthmatic; one day the symptoms culminating in sneezing, and another in asthma; or both sneezing and asthma may

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[1] Stricker, "*Human and Comparative Histology.*" Vol. II., pp. 58, 63 New Sydenham Society.

"*The Lymphatics of the Alveoli*, according to the observations of Wywodzoff (Wiener Medizinische Jahrbücher, Bund XII., p. 1) on the Lungs of Horses and Dogs, commence in small anastomosing lacunæ, destitute of proper coats, situated in the fibrous alveolar wall; the larger trunks run in the direction of the elastic fibres, and subsequently follow the course of the capillaries, yet not so strictly but that they frequently cross the latter, and form large lacunæ in their meshes. From these rootlets the *deep-seated* lymphatics (these also receive their lymph supply from the bronchi) arise on the one hand, which, accompanying the bronchi and vessels, extend to the root of the lung; and, on the other, the *superficial* lymphatics, which, lying close beneath the pleura, form a plexus investing the extremities of the lobules, and in man partly run towards the tubes, and partly dip in at certain points to communicate with the deep plexus."

"*Lymphatic vessels* are abundant, especially upon the internal layer of the *bronchi*, the internal fibrous investment of which they traverse to pass towards the roots of the lungs, where they enter the lymphatic glands that are there situated."

"The lateral walls of the contiguous alveoli of one and the same *infundibulum* (or alveolar passage), uniformly coalesce to form thin membranes, the alveolar septa. This, however, though common, is by no means constant in the case of the walls of adjacent alveoli belonging to different infundibular or alveolar passages. *These are usually separated by uniform thin layers of loose fibrous interstitial connective tissue.*"

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[2] I use the word "sneezer" for short, to represent the subject of the peculiar set of brain and catarrhal symptoms here discussed, which I am accustomed to call "Sneezing Asthma."

occur at once, in which case one or other generally takes the lead in severity, while the other passes off more lightly. When they are to terminate in a paroxysm of asthma, the events follow substantially the same order as when they are to culminate in the discharge from the eyes and nose; but pulmonary oppression takes the place of weight in the frontal and post-nasal cells, and mucous expectoration is substituted for coryza. The following are the principal difficulties in explaining the facts I have attempted to detail.

Primâ facie, they appear to indicate hyperæmia, relieving itself by hypersecretion. But if this were the whole truth, the hyperæmia should begin with the sleep, and persist till relieved by secretion. Whereas, in the cases under consideration, the hypersecretion in which the circle of symptoms culminates, is separated from the sleep by an indefinite interval—a whole working day, for instance, intervening during which all the functions of both brain and lungs may be performed with apparent freedom from hyperæmic signs—and the first set of symptoms (the "premonitory"), passes off, and is succeeded by a second set, apparently due to swollen mucous membranes, which symptoms are the immediate antecedents of the hypersecretion by which they are relieved.

Thus we have the following succession of phenomena. (*a.*) Sleep and ordinary causes of temporary cerebral hyperæmia. (*b.*) Brain symptoms produced alike by either of these factors. (*c.*) An interval during which these symptoms give place to (*d.*) symptoms of swelling of mucous membranes, continuing until relieved by (*e.*) hypersecretion. (*f.*) Return to a normal state.[1]

Now, if this succession of phenomena is to be explained

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[1] New Sydenham Society's *Biennial Retrospect*, 1869-70.

"Dr. G. Schwalbe (*Centralblatt*, 1869, p. 465) describes the arachnoid space around the brain as a lymphatic space, and considers it to be connected with the choroidal space of the eye, the space containing the perilymph of the ear, and the lymphatic plexus of the Schneiderian mucous membrane. These observations are in favour of the view that the serous sacs are only great dilatations of the lymphatic system."

by hyperæmia, relieved by hypersecretion, it is inconsistent with the present theory that sleep is coincident with vascular contraction and consequent cerebral anæmia.[1] For

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[1] Carpenter's *Principles of Human Physiology*. Seventh Edition, 1869.

"The interesting researches of Mr. Arthur Durham ('Guy's Hospital Reports,' Third Series, Vol. VI.) on the condition of the circulation in the brain during sleep, have shown that the brain is then in an essentially bloodless condition, and that not only the quantity but the rapidity of movement of the blood in the vessels is materially diminished; and this is corroborated by the observations of J. Hughlings Jackson on the Opthalmoscopic Condition of the Retina during Sleep (Royal London Opthalmic Hospital Reports), the optic disc being then whiter, the arteries smaller, the veins somewhat larger, and the neighbouring parts of the retina more anæmic than in the waking state." P. 649.

"It seems highly probable that in the delicate and extensive system of capillaries found in the pia mater and choroid plexus, a provision is made by which a large quantity of cerebro-spinal fluid can be effused or absorbed in a short space of time, to compensate for sudden changes in the balance of the circulation." P. 311.

Journal de l'Anatomie et de Physiologie, 1865, Vol. II., p. 567.

"M. Robin a découvert en 1859, autour d'un certain nombre de capillaires et d'artérioles du cerveau et de la moelle, une gaîne très-transparente, ayant de 0^{mm} 001 à 0^{mm} 002 d'épaisseur, et qui forme à ces vaisseaux une tunique surnuméraire. Entre cette gaîne et le vaisseau il existe un espace rempli par des globulins analogues à ceux de la lymphe.

"M. Robin à pensé que c'étaient là des lymphatiques de centres nerveux."

New Sydenham Society's *Biennial Retrospect*, 1869-70.

"Henle and F. Merkel (Henle and Pfeuffer's *Zeitsch.*, xxxiv., p. 49), Golgi (*Rendiconti d. R. Inst. Lomb.*, iii.), Roth (Virchow's *Arch.*, xlvi.), Gerlach (Stricker's *Handbuch der Lehre von den Geweben*, cap. xxx.) give full descriptions of the so-called connective-tissue or neuraglia of the nervous system.

"Lepine (*Archives de Physiologie*, No. iii., 1869) describes the connective tissue of the perivascular canals of the brain as being traversed by a delicate filamentous tissue.

"Weisbach (*Wien Med. Jahrb.*, xvi., p. 46), in experiments made to determine the *amount of water in the brain* in relation to age, sex, and disease, found that as age advances the amount of water steadily increases in the brain. On the other hand, the commissures and the medulla oblongata have the largest quantity in youth. The brain of the female, corresponding to its smaller weight, contains also less water than that of the male."

on that theory how can sleep come in as a factor on the same terms as causes known to produce temporary cerebral hyperæmia? On the other hand if sleep is accompanied by cerebral hyperæmia instead of anæmia, and the hypersecretion is to be taken as its direct result, then the interval occupied by (*c*) and (*d*) ought not to exist.

The idea suggested to me by these considerations is that there is *an intermediate condition not yet recognised which is common to the vascular contraction of sleep, and to the subsidence of temporary cerebral hyperæmia*; and the important question for solution is, what is the nature of this supposed intermediate condition?

When we turn from the cerebral to the pulmonary set of phenomena, we find their explanation surrounded by similar difficulties. If the lungs are rendered hyperæmic by sleep and by the other antecedents of the asthmatic paroxysm, such as rapid exercise[1] and the pulmonary oppression, asthmatic paroxysm and hypersecretion are simply the expression of hyperæmia and its effects, relieved by secretion, without any not yet recognised intermediate condition—then the hyperæmia should be found at its acme at the end of sleep, or at the end of rapid exercise, and should persist in both cases until relieved by the hypersecretion. But this is not so in either case—an interval constantly intervenes, and is often considerable, during which hyperæmic symptoms do not persist, and which is followed by pulmonary oppression finally relieved by hypersecretion.

It is necessary to guard against misapprehension due to the fact that an asthmatic person so *often wakes with a paroxysm* after a certain number of hours' sleep, which at first sight makes it appear that the immediate effect of the physiological condition of sleep has been the paroxysm and the secretion. But this is only a deception, for one hour's sleep

[1] I exclude from the present discussion the numerous antecedents of asthmatic paroxysm which may be classed as nervous, because they carry us back to a still more remote stage in the physiological sequence, which would complicate the present question, but which is in my opinion quite capable of being reconciled with the other views here expressed.

followed by three hours awake, may in these cases be followed by the paroxysm, &c., just as much as if the whole four hours had been spent in sleep; the complete establishment of the physiological condition of sleep being the necessary factor, and whether the succeeding interval is passed in sleep or awake, the effects of the factor follow in their due course.

Thus, supposing that the sleep and other antecedents of the asthmatic paroxysm are accompanied by pulmonary hyperæmia, this state is not apparently continued up to the time of hypersecretion; *as it ought to be if there is not an intermediate condition, as already suggested.* We have then in the case of the pulmonary phase of these cases; (*a*) sleep and ordinary causes of temporary pulmonary hyperæmia; (*b*) an interval during which there is freedom from asthmatic symptoms; (*c*) pulmonary oppression and asthmatic paroxysm; (*d*) hypersecretion; (*e*) return to the normal state. The symptoms called "premonitory" under the cerebral phase, will be more or less absent in the pulmonary phase according as it is complicated or not with the cerebral. Now, supposing the accepted theory of cerebral anæmia and sleep to be true, how is it that (*a*) cerebral anæmia of sleep, (*b*) pulmonary hyperæmia of sleep, (*c*) cerebral hyperæmia, from known causes of temporary cerebral hyperæmia, (*d*) pulmonary hyperæmia, from known causes of temporary pulmonary hyperæmia in the cases under consideration, all occur in the same category as factors, followed by the same peculiar phenomena, viz., overfulness and oppression of the neighbouring mucous tracts, relieved by hypersecretion from them, these phenomena being separated by a distinct interval from the sleep and other antecedents enumerated?

The hypothetical explanation which I have suggested is *an intermediate state common to all the given antecedents*, and in answer to the question, What is this intermediate state? I suggest that it is distension of the perivascular system of canals with liquor sanguinis, migrated from the red-blood vessels, that in the normal state an immediate return of fluid from the perivascular system to the red-blood vessels takes

place on the return of normal circulation in them, and that the *abnormal physiological condition* which exists in the peculiar cases under consideration consists in a derangement of this power of instantaneous change of place between the contents of the two sets of vessels.[1] It may be, of course,

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[1] New Sydenham Society's *Biennial Retrospect*, 1869-70.

"Dr. Broadbent (Humphrey and Turner's *Journal of Anatomy and Physiology*, iv., 1870, p. 14) demonstrates that the so-called 'selective' absorption of the lymphatics is apparent only, and that so far from being selective and special, it is general and residual, the materials they take up being, in fact, merely *the spare nutrient substances forced into the intertextural spaces, i.e., the commencement of the lymphatics, by the continued exudation of fresh fluid from the capillaries.*

Kirkes' *Handbook of Physiology*. 8th Edition. 1872.

"Recent discoveries seem likely to put an end soon to the long-standing discussion whether any direct communication exists between the lymph-capillaries and blood-capillaries; the need for any special intercommunicating channels seeming to disappear in the light of more accurate knowledge of the structure and endowments of the parts concerned. For while, on the one hand, the fluid part of the blood constantly exudes or is strained through the walls of the blood-capillaries, so as to moisten all the surrounding tissues, and occupy the interspaces which exist among their different elements, these same interspaces have been shown, as just stated, to form the beginnings of the lymph capillaries. And, while for many years, the notion of the existence of any such channels between the blood-vessels and lymph-vessels, as would admit blood-corpuscles, has been given up, recent observations have proved that, for the passage of such corpuscles, it is not necessary to assume the presence of any special channels at all, inasmuch as blood-corpuscles can pass bodily without much difficulty through the walls of the blood-capillaries and small veins, and could pass with still less trouble, probably, through the comparatively ill-defined walls of the capillaries which contain lymph.

"Observations of Rechlinghausen have led to the discovery that in certain parts of the body openings exist by which lymphatic capillaries directly communicate with parts hitherto supposed to be closed cavities. . . . . It would seem as as if the serous cavities, hitherto supposed closed, form but a large widening out, so to speak, of the lymph-capillary system, with which they directly communicate." (pp. 352, 353.)

"The real source of the Lymph, and the mode in which its absorption is effected by the lymphatic vessels, were long matters of discussion. But the problem has been much simplified by more accurate knowledge of the

that *normally* the whole burden of removing the perivascular fluid belongs to the lymphatics, and that the *abnormal* state in these cases consists in a defect in the power of the lymphatics to do this with the requisite rapidity. On the return of normal circulation in the red-blood vascular system of the organs concerned, they are left saturated with the contents of the perivascular canals the burden of removing which is thrown from the blood-vessels upon the lymphatics and upon the neighbouring mucous tracts: this slower process of relief occupying the interval between the two sets of phenomena to which I have specially directed attention. And it is evident that the length of the interval will depend upon (1) the degree of perivascular saturation; (2) the extent of the defect in the power of normal restitution between the two sets of vessels; and (3) the activity of the lymphatics and of the mucous membranes. And it is also evident that such an abnormal condition, dependent as it would most probably be on the vasomotor nervous system,[1] would be very subject to varia-

anatomical relations of the lymphatic-capillaries. It is most probable that the lymph is derived, in great part, from the liquor sanguinis, which, as before remarked, is always exuding from the blood-capillaries into the interstices of the tissues in which they lie." (p. 364.)

"There is nothing in the mode of absorption by blood-vessels, or in the structure of veins, which can make the latter more active than arteries of the same size, or so active as the capillaries, in the process. . . . . .

"It appears that every substance, whether gaseous, liquid, or a soluble or minutely-divided solid, may be absorbed by the blood-vessels, provided it is capable of permeating their walls, and of mixing with the blood; and that of all such substances, the mode and measure of absorption are determined solely by their physical or chemical properties, and conditions, and by those of the blood and of the walls of the blood-vessels." (p. 367.)

"But largely as the capillaries are influenced by these (the small arteries), and by the conditions of the parts which support and surround them, their own endowments must not be disregarded; they must be looked upon, not merely as passive canals for the passage of blood, but as possessing endowments of their own, in relation to the circulation. The capillary wall is, according to Stricker, actively living and contractile, and there is no reason to doubt that, as such, it must have an important influence in connection with that nutritive exchange which goes on without cessation between the blood within and the tissues outside the capillary vessel." (p. 166.)

[1] See Note to p. xxx., "Nervous Antecedents of Asthma."

tions in degree, and might easily and rapidly pass away under exceptionally favourable circumstances.

If this hypothetical explanation which I have suggested should prove to be correct, it would appear to involve the conclusion, that if a contracted anæmic condition of the red-blood vascular system of the brain is a necessary condition of sleep, this is coincident with migration of liquor sanguinis into the perivascular canals, by which concurrence of circumstances the necessary element of equally balanced cerebral pressure is maintained, while the element of functional excitability due to the abundant circulation of red blood is removed; thus functional rest without arrest of nutrition is secured.

If this reduction of red blood circulation, with the substitution of liquor sanguinis saturation, is the cause of sleep, it will account for many of the phenomena of cerebral diseases and their relation to sleep and to ordinary causes of cerebral hyperæmia, which are unexplained by the theory of cerebral anæmia without perivascular saturation. And any defect in the power of instant substitution of red blood circulation for liquor sanguinis saturation will henceforth constitute a most important element in cerebral pathology, and when regarded in connection with the peculiar and puzzling coincidence of phenomena characterising the cases to which I have especially alluded, will, I hope, throw hitherto unseen light upon the physiology of asthma, cerebral disease, and sleep, opening up new ideas with regard to treatment.[1]

Before leaving this subject, I must point out the remarkable importance, in relation to Diseases in the Chest, of the

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[1] I am fully aware that many other suggestions may be made for the explanation of the phenomena discussed in this chapter, and I may refer to Case LXXIV.* p. 42, as an instance of this. But I am now disposed to think that in that case the perivascular hypothesis offers a more complete solution of the peculiar conjunction of symptoms than the one I have given at pp. 41, 44.

newly discovered PUMP-LIKE ACTION OF THE DIAPHRAGM upon the lymphatic system.[1]

No complication of Chest complaints is more distressing to the patient and distracting to his physician than the setting in of dropsy, and anything which contributes to our knowledge of its pathology, and assists us to find new means for its prevention or relief, must be greeted by all practising physicians with the warmest feelings of gratitude. And such gratitude is due to the discoverer of this hitherto unknown action of the diaphragm in respiration upon the circulation in the lymphatics.

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[1] KLEIN, *op. cit.* *The Lymphatic System of the Centrum Tendineum of the Diaphragm*:—"The question presents itself now, What is the physiological value of the straight lymphatic vessels? Ludwig and Schweigger-Siedel already attributed to these straight lymphatics an important part in absorption. According to those authors, they are widely dilated during the inspiration position of the diaphragm, corresponding to the action of the muscles and tendons of this latter, whereas they are compressed during the expiration, the lymphatics of the pleural surface of the diaphragm being quite the reverse, and consequently the respiratory movement of the diaphragm acts like a pump on the lymphatics. (The free communication of the lymphatics with the peritoneal cavity, by means of stomata, will be discussed hereafter.) This, however, is not the only way in which the straight lymphatics act. We have mentioned before that the lymphatics of the diaphragm are arranged in an anterior and posterior system, the former discharging itself in trunks that run towards a gland, the latter in a wide short trunk that runs directly into the thoracic duct. Now the straight lymphatic capillaries are the vessels which perform the communication of those two systems, and this is their chief action:—as the deep straight lymphatic capillaries and the superficial ones represent, as we have seen, only one category of vessels, we are justified in saying that this category of lymphatic capillaries discharges itself in two directions: one, freely, into the thoracic duct, and a second, less freely, towards the sternal gland. In a following chapter we shall see that the straight lymphatic capillaries, the deep ones as well as the superficial ones, stand in free communication with the peritoneal cavity by means of vertical lymphatic canals (stomata of the authors); consequently we have to substitute for the diaphragm of L. and S.S., representing the lymphatics as a single pump, a diagram of a pump with two cylinders, the one cylinder corresponding to the pleural vessels of the anterior system, the other to those of the posterior system, while the pipe connecting the two cylinders is represented by the straight capillaries, and the piston tube by the vertical lymphatic canals. It must be borne in mind, however, that the two cylinders act simultaneously."—Pp. 45, 46.

It is impossible to contemplate the statement which I here extract from the admirable monogram of Klein, already quoted, without being convinced that henceforth we must add to the hitherto recognised causes of dropsy in Chest Disease, the paralysed condition of the diaphragm; and we shall at once see that the removal of this by all practical means ought to form one of our anxious considerations in the treatment of Winter Cough, Catarrh, Bronchitis, Asthma, and other forms of Chest Disease.

ON WINTER COUGH.

LECTURE I.

Introductory Remarks.—Importance of Winter Cough.—Necessity for a searching enquiry into the History of Cases.—Arrangement of Cases into Five Clinical Groups.—Questions as to the relation between Emphysema, Bronchitis, and Winter Cough.—Mode of production of Emphysema discussed.

Gentlemen,—I think you will agree with me, that when once a medical man has come before the public to *practise* his profession, the first duty incumbent upon him is to treat disease as successfully as possible.

However much his tastes may tempt him to devote his time and energies to the purely scientific departments of his profession, he must never lose sight of the fact that he is neglecting his duty in proportion as he allows himself to be led away from such studies as have a practical bearing upon the prevention, relief, and cure of disease. There ought to be no alternative in his mind, between giving up practice altogether, and devoting all his best energies to making his practice beneficial to his patients in the highest possible degree. I make these remarks in explanation of my having, in these lectures, passed by many points exceedingly interesting as subjects of scientific speculation and enquiry, in order that I might devote all the time at our disposal to those which come more strictly within the limits of practical medicine.

Again, I can but think that, as practitioners of medicine, we ought to look with far more interest upon anything that conduces to the cure or relief of the diseases which affect the largest number of persons, than upon any

rare and solitary cases, however curious they may be. Therefore, I have not hesitated to devote a large amount of time and study to the very common and well-known classes of cases which form the subject of these lectures.

I have included them all under the crude name of "*Winter Cough*," because it expresses the one conspicuous symptom, common to them all, which especially brings such cases under the eye of the physician. All the patients had a cough, which was either limited to the winter season, or was much aggravated during that part of the year.

However tedious and wanting in the excitement of novelty a common case of Winter Cough may be to the medical practitioner, there are few complaints which so painfully absorb the interest and attention of the patient; and as such cases are extremely numerous in all ranks of society in this climate, they represent an enormous amount of human suffering, and from this fact alone demand our most earnest consideration.

I need hardly tell you that at this hospital such cases abound in every form and variety, and afford the widest possible field for enquiry, whether it be into their symptoms and physical signs, their course and treatment, their consequences and terminations, or their causes and natural history.

As two or more winters usually pass before the tendency of the complaint to recur or to become habitual is established in a patient's mind, these cases of Winter Cough have always a history more or less long, and of which it is often not very easy to get a correct account. But in this history lie just those points of the case which are essential to a proper understanding of the causation of the disease, and of the prospects of cure or relief. It is into this

history, therefore, that we should always push our enquiries with great perseverance, taking the utmost care not to be misled by the erroneous and conflicting statements which patients are sure to make, unless we give them time to think over the past before committing themselves to an account of it.

In order to guard as much as possible against this source of fallacy, and at the same time to secure uniformity in a large number of reports, so as to admit of their chief points being tabulated, I have been accustomed to give to hospital patients a printed list of questions to think over at their leisure, before committing themselves to the answers.

These questions are forty-one in number and refer to the short breath, the cough, the taking of colds, the past illnesses, the occupation, the dwelling, the habits, and the family history of the patient.*

In collating the notes of a large number of cases the histories of which are taken in this manner, and to which the physical signs and symptoms are attached, I have found that they may be very simply arranged in five clinical groups.

See Index to cases.

1. Cases in which there are physical signs of Emphysema, and not of Bronchitis, and in which there is no history of previous Bronchitis.

2. Cases in which there are physical signs of Emphysema, and not of Bronchitis, but in which there is a history of previous Bronchitis.

3. Cases in which there are physical signs of Bronchitis, and not of Emphysema.

4. Cases in which there are physical signs both of Emphysema and of Bronchitis.

5. Exceptional cases, in which there are no physical signs, either of Bronchitis or of Emphysema.

* For form of report see Appendix I.

You will at once observe, that these groups give us Emphysema and Bronchitis as the two conditions of disease which, with the exception of a few cases, are ever present, either singly or combined, when there is Winter Cough.

It is evidently, therefore, the leading point of interest, in a practical sense, to know what is the relation of these states—Emphysema and Bronchitis—to each other, and to the complaint in question, viz., Winter Cough.

Is the cough produced by Emphysema, by Bronchitis, or by both, or is it dependent upon some other condition which accompanies both the Bronchitis and the Emphysema? [1]

Is the Bronchitis produced by Emphysema, or Emphysema by Bronchitis?

Is the Bronchitis or the Emphysema produced by the Cough?

In what way, if any, do Bronchitis and Emphysema influence each other?

These are questions which lie at the bottom of our treatment of the disease, whether it be preventive, curative, or alleviative; and I am sorry to say that they cannot all be answered so simply as might at first sight appear, for some of them have already engaged the best attention of excellent pathologists and practical physicians, and the conclusions they have respectively come to have been very different.

As my own views on the subject are in opposition to those of some of the physicians for whose opinions both the profession generally and myself entertain the greatest respect, [2] I cannot put them forward without, to some

[1] See Appendix II.

[2] This was written in 1866. I am gratified to find that, now, (1871) nearly the whole profession agrees with me on this important subject, viz., the mode in which Emphysema is usually produced.

extent, attempting to support them by arguments, and I consider that a right understanding of this part of the subject is so essential to the whole question of the treatment of Winter Cough, that I cannot pass it by. I will, however, attempt to put these views before you as briefly as a due respect for the opinions of others will permit.

The great question of dispute relates to the mode of production of Emphysema.

How is Emphysema produced?

1. Is it due to the forcible expansion of the air vesicles of the lungs during the inspiratory act?
2. Is it due to a compensatory dilatation of the air vesicles rendered necessary by the collapse of neighbouring portions of lung?
3. Is it due to a degeneration of the tissue of the air vesicles, which renders them incompetent to withstand the normal dilating influences during normal respiration?
4. Is it due to the forcible expansion of the air vesicles of the lung during the expiratory act?

You are aware that there are powerful and accomplished advocates for each of these four propositions, and when I assert, as my strong conviction, that the fourth alone can be maintained[1]—that the production of Emphysema can be more satisfactorily explained by the expansion of the air vesicles during expiration, than by any other cause, and that this belief is essential to the proper treatment of Winter Cough—I feel that I am bound in some measure to support the opinion I hold, by arguments which may commend

[1] I allow collapse of lung and degeneration of tissue a place among the conditions *predisposing* to Emphysema in certain exceptional cases, but I maintain that the over-distension of the cells is produced by the expiratory act.

it to your respect, although I cannot venture to occupy your time with such a detailed and abstruse discussion as would be necessary to answer all objections urged on the various sides of the question.

The first thing to do is to show that the phenomena of Emphysema can be satisfactorily explained by the expiratory theory of its production.

The second is to show that the conditions required by this theory for the production of these phenomena are supplied by disease.

And the third is to show that evidences of the existence of these conditions are to be found in the clinical histories and features of cases of Emphysema.

Having done these things, I will briefly point out some of the vital objections to the other theories to which I have referred.

Emphysema of the lung, as you well know, may be limited to a few air-cells, or may affect one or more lobules, a whole lobe, and even the whole of one or both lungs. It essentially consists in a dilatation of the air-cells, which may be slight or extreme, and in attenuation and rupture of the dilated walls of the cells, so that contiguous cells are made to communicate with each other, and in the further progress of the disease the partitions between the cells almost entirely disappear, and large irregular air sacs are formed by the coalescence of neighbouring cells. In this way the bulk of the affected lung is increased, and its normal elasticity is lost. (See Plate II., fig. 4.)

You are probably aware that a state resembling Emphysema may be produced in a healthy lung after death by forcibly blowing into the air tubes, and thus over-distending the vesicular structure. Dr. John Hutchinson

found that in pumping air after death into the human chest, a pressure of nearly 12 ozs. avoirdupois upon every square inch of surface was sufficient to rupture the pulmonary substance. There can be no doubt that during life the air-cells will admit of much greater distension before rupture of their walls occurs than after death, especially if the distending force is applied very gradually. But in essential characters the distension and rupture which occurs when the lungs are forcibly distended after death, are analogous to that which occurs during life in the production of Emphysema.

I am aware that this experiment has been supposed to favour the inspiratory theory of the production of Emphysema, but a moment's thought will teach us that it is clearly no illustration of an inspiratory operation. Inspiration is distinctly a suction force exerted from without, in which the air simply follows the expansion of the chest-walls, and of the lung, and is accompanied by no *vis a tergo;* whereas, in the experiment quoted, the lung is distended entirely by means of a force exerted from behind.

We see, then, from this experiment, that all that is necessary for the production of Emphysema is an undue pressure of air upon the internal surface of the air-cells.

You are no doubt familiar with the fact that what is called "Interlobular Emphysema" may be produced by forcible expiratory acts. That during such acts one or more air-cells may become so over-distended, that rupture takes place, and the air from the lung is poured into the cellular tissue between the lobules, whence it may find its way into the cellular tissue of the mediastinum, and thence into that of the chest and neck. I well remember a case of this kind which was brought to my notice by Dr. Niell, of Aldersgate-street. He was attending a lady

in a difficult confinement, and suddenly, during a violent expulsive effort, the patient's neck and shoulders swelled up to an enormous size, and the cellular tissue was found to be full of air. Many such cases have been witnessed, always occurring during some violent expiratory effort, as during parturition, defæcation, lifting heavy weights, or coughing. A number of cases, in which this accident occurred during fits of coughing, are recorded by M. Guillot (Archives générales de Médecine, vol. ii., 1853) and many others may be found scattered through other works and periodicals.

From these two facts, then,—(1) that distension and rupture of the air-cells, similar to Emphysema, have been produced experimentally by undue pressure of air applied to the inner surface of the cells, and (2) that similar distension and rupture of the air-cells have been produced accidentally by forcible acts of expiration, it may be concluded that vesicular Emphysema may be produced by pressure applied to the inner surface of the air-cells during expiration.

Now, although by those who only approve of complicated modes of proof in scientific matters, this may appear a somewhat short and off-hand way of deciding a difficult question, I think you will find it unanswerable, and that is the important point to look to. If we have once seen unmistakably that a thing can be done, and has been done, we need not trouble ourselves much with arguments which attempt to prove theoretically that it cannot be done. And here we have two very simple illustrations, the one showing that it can be done, and the other that it has been done, and therefore, to my mind, the question is so far settled.

The next portions of the proof required of us, viz., to

show that the conditions necessary to the expiratory theory are supplied by disease, and that evidences of the existence of these conditions are to be discovered in the clinical histories and features of cases of Emphysema, cannot be disposed of in so short and off-hand a way. It is beset with all those difficulties which must ever surround questions which deal with complicated vital acts conducted within the body; and in this case an additional difficulty, and a fertile source of error, is introduced by the circumstance that considerable periods of time are in most cases occupied in the development of the effects we have to deal with, and by the circumstance that the cause may have ceased to exist at the time the effects are brought under our observation. We have, therefore, to search in one individual for the cause of effects which we witness in another:—a mode of inquiry than which nothing can be more puzzling and open to fallacy. And when the effect is discovered, and the cause found wanting, it is at once competent, for those who believe that the assigned cause is not the true one, to bring these cases forward as proofs of the correctness of their opinions. Our great endeavour, therefore, should be to find a mode of observation which shall, as far as possible, remove this source of fallacy.

It has appeared to me that this source of fallacy must remain so long as the post-mortem examination of the patient is depended upon for the explanation of the phenomena of his disease. I am speaking especially of the disease now under our consideration, although the remark may apply to others. A simple illustration of what I mean is this:—The examination of the lungs of a man who has long suffered from attacks of Spasmodic Asthma may show well-developed Emphysema. But not

a trace may remain of the bronchial spasm, the recurrence of which produced the Emphysema; whereas, on the other hand, there may be found many other changes in his bronchial tubes, or in the parenchyma of the lung, due to causes totally unconnected with either the Asthmatic Spasm, or the Emphysematous air-cells, while the history of the case may be totally incompetent to determine whether or not any relation existed during life between the pathological changes discovered after death. On the other hand, there were, in all probability, periods in the course of the case when symptoms and physical signs, properly interpreted, might have told what morbid causes were in action, and what organic changes were being produced by them, the course of both being watched and traced.

In making these remarks, I wish particularly not to be misunderstood. I do not in the least undervalue the great importance of morbid anatomy, when the conclusions drawn from it are kept within legitimate limits.

In the next place, I have to show what are the physical conditions required in the chest to produce Emphysema by expiratory acts, and what clinical means we possess of ascertaining that such conditions exist in any given case.

In the operation which we commonly call "straining," we first take a deep inspiration, by which the thorax is distended, and the lungs filled with air, then close the glottis, so as to keep the air locked into the chest, and with the thorax thus tightly distended, we put the abdominal and other expiratory muscles into forcible contraction.

If you were to inflate a small bladder, and then grasp it forcibly in the hand, you would not be much surprised if the bladder were to burst at any point where its walls happened to be weakest and least supported by the hand.

We cannot, then, be surprised to find, that, when the distended lungs and chest-walls are forcibly pressed on all sides by powerful muscles, while the escape of the air by the glottis is prevented, they occasionally give way at some of the weakest points. This happens occasionally to the chest-walls themselves, so that portions of lung are actually protruded through them, constituting thoracic herniæ. But it more commonly happens that the delicate air vesicles burst at some part of the lung, where the external pressure happens for the moment to be the least, and give rise to inter-lobular Emphysema (see p. 7).

It is, then, very clear, that during these efforts of straining, when, after inspiration, an obstacle is put in the way of expiration, and at the same time muscular pressure is brought to bear upon the outside of the chest, air is driven with force against the inner walls of the air-cells; that, in fact, so far as the air-cells are concerned, the operation is similar to the experiment of blowing into the lungs down the bronchial tubes. And, as we might reasonably expect, the effects of two similar causes are alike, viz., the distension and rupture of the air-cells.

These, then, are the physical conditions required in the chest, to produce a strain upon the inner surface of the air-cells during expiration. But it remains to show that these conditions are supplied by the circumstances which precede and accompany the occurrence of Emphysema, and also that the external pressure upon the lungs, exerted during these periods of straining, is subject to be weaker in some places than in others.

It is singular that it should not have been recognised, simple and self-evident as it appears, that what applies to the interference with the calibre of the small air tubes applies equally to the large ones. If the calibre of a

tube, be it large or small, is justly proportioned to the transmission of a certain volume of air and no more in a given time, any decrease in the calibre must necessitate either a longer period of time for the passage of the same volume of air, or an increase in the rate at which the air passes. That is to say, a larger slower tide in the first case, and a smaller faster tide in the second case, must pass in the same period of time. But it is clear that a greater pressure from behind is required to urge the smaller-faster tide than that required for the larger-slower tide, if equal volumes are to pass in the same time, as stated, and in proportion to this increase of pressure there will be increase of friction upon the walls of the tubes.

It is evident therefore, that, as the large bronchi, the trachea, larynx, and nasal passages, all are nicely adjusted to carry a given volume of air in a given time, any thickening of their linings, contraction of their walls, or any other cause, which diminishes their calibre, must interfere with this adjustment, and necessitate either a slower tide through them and thus an increase in the time occupied by the passage of a certain volume of air, or an increased *vis a tergo* and a quicker tide through them, maintaining the just period at which the given volume passes, but doing so at the cost of increased pressure and increased friction.

In either of these cases the normal respiratory act is seriously disturbed.

It is true that in the case of the nasal passages, so subject to temporary obstructions, special provision has been made, in the power of breathing through the mouth, to avoid, to some extent, the interference with respiration which might otherwise so frequently occur. But below the fauces there is no such safety valve, and the changes

in calibre below this point must of necessity disturb the respiratory adjustment.

For these reasons I consider that any decrease of calibre in the nasal passages, larynx, trachea, or large bronchi, must be considered as obstructions to the expiratory tide, and that they are, in fact, much more important obstructions as regards the production of backward pressure than any that can occur in the small air passages, because they interfere with the main thoroughfares of the lungs, whereas the others merely stop the smaller ramifications through which there is not only much less traffic, but the influence of its obstruction is limited to a small number of cells.

It follows, then, that I include among causes of *sudden* strain on the air-cells circumstances which have been heretofore overlooked, viz., the acts of sneezing, and of blowing the nose, when they are convulsively or violently performed, and when an abnormal obstruction is placed in the way of the outward tide, as in nasal polypus and in tumefaction of the naso-pulmonary mucous membrane.

And I include among causes of obstructed outward tide during *ordinary* respiration, circumstances which have heretofore been overlooked, viz., catarrhal thickening of the mucous lining of the nose, larynx, trachea, and large bronchi.

During all acts of coughing, a certain backward shock of air occurs before the glottis is opened, and before the body to be expelled can be ejected. But this becomes a cause of Emphysema when the cough is unusually convulsive and severe, and when some obstruction unusually difficult to remove is placed in the way of the outward tide.

It has not, so far as I can learn, been recognised, that

when the bronchial tubes are diminished in calibre an obstruction is placed in the way of the outward tide, which does not affect the inward tide to the same extent. Yet such is undoubtedly the fact. It occurs in this way :— The act of inspiration consists in enlarging the capacity of the chest by muscular force, and thus removing from the whole lung the circumferential pressure of its own elastic force; the consequence is, that the expanding lung expands the enclosed bronchial tubes to the fullest extent, and thus favours the influx of air. The normal expiratory act consists in a simple recoil of the elastic lung, followed by that of the elastic chest-walls ; a pressure is thus exerted on the circumference of the bronchial tubes, which tends to diminish their calibre, and favours the exit of air ; but this expansion during inspiration, and compression during expiration, is all calculated for in the adjustment of normal respiration, and no backward pressure is produced ; but so soon as a sufficient diminution has occurred in the calibre of the air passages to require a greater expiratory force than is supplied by the elastic recoil of the lung, an entirely different relation is set up between inspiration and expiration.

So soon as the additional force of *muscular expiratory efforts* is called for, the circumferential pressure upon the bronchi acts unfavourably to the outward tide; the air-cells are pressed upon the walls of the bronchi which they surround, and act as causes of increased obstruction to the already diminished passages. In this way diminished calibre of the air passages tells more unfavourably upon expiration than upon inspiration, and becomes a cause of backward pressure of air upon the cells of the lungs during the expiratory act, even in ordinary breathing.

The mode of operation may be watched in the nose,

only that there it is exactly reversed. The tendency of the walls of the nose, not the alæ nasi, is to collapse during inspiration, and to expand by the pressure of air during expiration. If we experiment upon ourselves, while suffering from the tumid stage of nasal catarrh, we shall find that it is often impossible to inspire through the nose —the suction-force exerted by the chest producing collapse of the nasal walls, and complete obstruction—when it is comparatively easy to expire through the nose in consequence of the passages being opened by the outward tide of air. On the other hand, if we try a similar experiment with the chest during the tumid stage of bronchial catarrh, we shall find that it is easy to inspire, when expiration is attended with labour in consequence of the outward pressure upon the obstructed tubes still further diminishing their calibre.

Supposing it to be granted that, under the circumstances which we have considered, a backward pressure does occur upon the inner surface of the air-cells, it remains to be shown that the external pressure upon the lungs during these periods of strain is subject to inequalities.

The principal objection raised to the expiratory theory of the production of Emphysema is an assertion that such inequalities do not exist, an objection which is very well set forth by Dr. Gairdner in the following words :—" Even when the air vesicles are maintained at their maximum or normal state of fulness, by a closed glottis, any further distension of them is as much out of the question as would be the further distension of the bladder, blown up and tied at the neck, by hydrostatic or equalised pressure, applied to its entire external surface." (Monthly Journal of Med. Science, vol. xiii.) This is, in fact, the stand-

point in the argument; and whatever force it might have as a proof that over-distension of the air-cells cannot be produced by expiration is turned in the opposite direction if it can be shown that it breaks down at its most vital point when submitted to the test of experiment; if, in fact, Dr. Gairdner's "bladder blown up and tied at the neck," instead of having "equalised pressure applied to its entire external surface," has the pressure applied unequally, as if grasped by the hand. And whereas there is no evidence to prove the equalised character of the pressure, there is plenty in favour of the unequal pressure.

It seems to be assumed by those who use this argument, that in ordinary normal respiration the air is forced from the lungs by the elastic pressure of the thoracic walls. If this were the case it would certainly be necessary that the weakest parts of those walls should at least be strong enough to prevent any eccentric yielding of the parts to be compressed, viz., the lungs. But I believe this assumption to be entirely false. In a state of health the elastic contractile power of the lung itself is so much in excess of the power of the chest-wall to act upon it, that when the thorax has contracted as far as it is possible for it to go, the lung is ready to contract still further, and is actually held back from so doing by its connections with ths chest-wall. This has been shown by Dr. Hyde Salter, who found in some very carefully performed experiments, that the lung of a dog when released from the thoracic parietes, undergoes a reduction of one-fifth of its volume, and that in the human subject the "elastic contractility of the lung is always drawing on the inner surface of the chest," so that, when the ribs have subsided to the exact point at which of themselves they would be

disposed to stop, they are carried a little further, and only stop when the lungs have drawn them so far beyond their proper point of rest that the force of recoil thereby generated is exactly equal to the contractility of the lungs." (Lancet, July 29th, August 5th, 1865.) The consequence is, that the chest-wall, in ordinary expiration, has only to follow the contracting lung, so that it shall be in a position for expansion when the time arrives for the next inspiration. There was no need, therefore, that the singular equality of pressure assumed by the argument referred to, should be provided; and accordingly, in the wise economy of nature, it has not been provided. But when the outward tide is interrupted by some abnormal obstruction and a call made upon the elastic recoil of the lung greater than that for which it is prepared, the lung, instead of taking the lead and being only followed by the chest-walls, falls back upon them for assistance, and they in their turn being incompetent by their elastic force to overcome the difficulty, fall back upon the expiratory muscles to assist in the act of compression. In this operation all the inequalities of pressure which may exist become opportunities for the over-distension of the air-cells, as they are urged, in this direction and in that, in the attempts to overcome the obstruction to the outward tide of air.

A striking illustration of the way in which the lungs may be distended during forced expiration in any direction in which the outward pressure is deficient, was shown in the case of M. Groux, when exhibiting in this country at the different Medical Schools. During a violent expiratory act the lung of one side came forward in the upper part of the fissure which existed in his chest-walls, and formed there a distinct elongated resonant tumour, but

no such result took place during inspiration. That, in the normal chest, inequalities of circumferential pressure exist during expiration has been clearly shown by Sir Wm. Jenner and others. Thus Sir Wm. Jenner says :—"We have only to watch a person whose chest is exposed during a fit of coughing, to see what a consideration of the anatomical constitution of the thoracic parietes would *à priori* lead one to expect. . . . Before coughing, a person makes a deep inspiration, *i.e.*, he distends as far as possible the air-cells; he then closes the glottis, and forcibly compresses the lungs by the thoracic and abdominal parietes; the moment the compression of the lungs has attained a certain point, he opens more or less the glottis, and the air is driven forward by the muscular effort and by the elasticity and contraction of the lungs and of the thoracic walls, with a force proportionate to the compression to which it was subjected before the opening of the glottis.

"Now it is manifest that if there are parts of the thoracic walls which are more yielding, or which, during powerful expiratory efforts with a closed glottis, contract less than others, the air immediately before the opening of the glottis will be driven from the compressed portions of the lung into the air vesicles of the lung situated under such parts of the walls, with a force proportionate to the general muscular and other powers in play, to the local want of compression, and to the degree of yielding of the walls at those particular spots." "That there are such parts," he continues, "and that they are exactly those which are most frequently the seat of vesicular Emphysema, and the sole seats of extreme dilatation of the air-cells, is demonstrable. . . .

"That during violent expiration, with a more or less

closed glottis, the air is actually driven into the lung-vesicles of the apex with power enough to distend them to the utmost, is demonstrated by the supra-clavicular bulging which may be seen during a fit of coughing, and the hand has only to be placed upon the same part to prove that the lung tissue subjacent is, during strong expiration, distended by a considerable force. Percussion proves that the bulging to which I refer is pulmonary.

. . . "The cells of the anterior margin of the lung are, like those of the apex, forcibly distended when violent expiratory efforts are made with the glottis closed, or imperfectly opened. . . .

"Again, the margin of the base of the lung, the part of the lung in the vicinity of the root of the organ below the entrance of the bronchus, and the little ridge of the lung which lies behind the trachea on the right side forming the posterior margin of what may be termed the tracheal groove on the lung, are, in a like manner, imperfectly supported, and comparatively uncompressed during violent expiration. The base, too, of the left lung, generally, is less firmly supported than is the corresponding part of the right lung—the liver being a more unyielding organ than the stomach, and compressing the base of the right lung more uniformly than the spleen and stomach do that of the left lung. The consequence of this want of support and of compression of the parts of the lung last enumerated is, that they, like the apex and the anterior margin, are the chosen seats of Emphysema." (Med. Chir. Trans., Vol. XL.)

Many other sources of inequality of pressure upon the lungs might be enumerated, amongst which I would suggest the mobility of the heart, which permits it to be pushed downwards, as proved by the change in its position

which actually takes place when the upper parts of the lungs become seriously Emphysematous.

Again, the possibility of muscular contractions being more powerful and complete in some sets of muscles and in some sets of fibres than in others at the same time, is familiar to us all in other parts of the body; and it is only reasonable to suppose that similar irregularities occur when, from any cause, the muscles of expiration are called upon to perform more persistent duties than those for which they are normally intended.

A remarkable coincidence of backward pressure upon the air-cells and absence of uniform external compression, must occur when convulsive acts of coughing or sneezing are rendered abortive of their effects by the obstructing body, which those efforts were intended to remove, obstinately resisting their force; for the whole muscular force discharged upon the obstructing body must be thrown back upon the volume of air behind it at the very moment when the expiratory muscles have fallen into relaxation and disorder after their convulsive effort.

But even if we could not thus identify the modes and occasions of irregular and unequal pressure upon the superficies of the lungs, there are facts to show that such inequalities must exist.

The fact, for example, that in lobar Emphysema the surface of the lung is often marked with the impressions of the ribs, shows that the pressure from the chest-walls is not so exactly uniform but that the ribs press more and the intercostal spaces less. Again, in lobular Emphysema "the Emphysematous lobules are seen on the surface of the lung, protruding beyond the level of the surrounding tissue and along the margins of the lobes; they often

form projections of considerable size, in some instances becoming developed into the so-called appendages." (Dr. Waters.)

If the equality of external pressure can so completely fail in one spot as to allow such projections to occur and to become permanent, it is clear that it may occur in other parts, and probably in different parts of the chest at different times.

But, in truth, we need hardly go further than the simple proposition with which I started — that distension and rupture of air vesicles producing interlobular Emphysema have again and again occurred during violent expiratory acts, is an unanswerable proof that inequalities of external pressure must occur during expiration sufficient to account for all the effects we require.

LECTURE II.

Conclusions relating to the production of Emphysema.—Evidence of the causes of Emphysema to be found in clinical histories.—Properties of mucous membranes, Catarrh, Asthma.—Illustrative Cases, Tables I., II.

It has now been shown that distension and rupture of the air-cells may be produced experimentally by blowing forcibly into the lungs from the trachea, and that distension and rupture of the air-cells, causing interlobular Emphysema, have been produced by forcible expiratory acts. Presuming it to be granted from the arguments which have been adduced—

1. That obstruction to the outward tide of air may be produced by disease.
2. That such obstruction will cause pressure on the inner surface of the air-cells during expiration.
3. That pressure so caused may dilate the air-cells (as in Emphysema) if the pressure on the superficies of the lungs is subject to be unequal in force at different parts during one act of forced expiration.
4. That such inequalities of pressure do occur.

Then it follows that we have shown as proposed—

1. That the phenomena of Emphysema can be satisfactorily explained by the expiratory theory.
2. That the conditions required by this theory for the production of these phenomena may be supplied by disease.

It now remains to show that—

Evidences of the existence of the required conditions

may be found in the clinical features and histories of cases of Emphysema. (See p. 6.)

Let us, then, enumerate the principal conditions for evidence of the present or past existence of which we have to search in cases of Emphysema.

The required conditions consist of any circumstances which may press the air in the lungs back upon the inner surface of the air-cells with greater force than their elastic properties are competent to resist, and thus deprive them of the power of again resisting a distending force which previously they were equal to withstand. They may be divided into two classes—

Class A.—Circumstances which may *at once* overstretch the air-cells.

Class B.—Circumstances which may gradually overstretch the air-cells.

These two classes of circumstances often succeed each other, and thus, what one begins, is carried forward by the other.

The conditions included under Class A, or such as may *at once* overstretch the air-cells, may be conveniently considered under two heads—

1. Violent expiratory acts, as in defæcation, parturition, lifting heavy weights and the like, performed with a closed glottis.
2. Convulsive expiratory acts, as in whooping-cough, croup, laryngitis, fits of sneezing, nose-blowing and the like, when of undue force and opposed by undue resistance.

The second class of circumstances, or such as may *gradually* overstretch the air-cells, may be conveniently considered under four heads.

1. Ordinary acts of coughing, when the free expulsion of the air in the chest is prevented by some unexpected obstruction at the moment when the glottis is opened and the expiratory paroxysm has culminated.
2. Ordinary acts of sneezing and nose-blowing, opposed by considerable obstruction of the nasal passages, and frequently repeated.
3. Ordinary respiration, when the outward tide is sufficiently obstructed by narrowed naso-pulmonary air passages to require muscular expiration.
4. Ordinary acts of coughing, sneezing, or nose-blowing, when some portions of the air-cells are deprived of their normal circumferential supports.

Class A, *Order* 1.

Excessive strain from defæcation, parturition, lifting heavy weights, and the like.—It is familiar to every medical man that in cases of hernia due to these causes, it is so difficult for patients to recall the exact circumstances, that, even in so serious an injury, the history of when and how it happened is frequently most obscure. The injury is, in a large number of cases, only detected by accident long after it happened; and in endeavouring to account for it the patient will often refer to several occurrences, either of which might have been a sufficient cause, and will as often be quite unable to remember any occurrences of the kind.

In the case of such an injury as the over-straining of the air-cells, which may not have been attended with any pain or serious inconvenience at the time and may have long continued to give no serious inconvenience, it is not surprising that patients are unable to give a satis-

factory history of its occurrence in a large number of instances, and that in others they are able to remember several occurrences, either of which might have been the cause of the damage; so that either way the exact history is left in obscurity.

Class A, *Order* 2.

Fits of convulsive cough, sneezing, excessive nose-blowing, and the like.—What has been said of the obscure history of circumstances under the last heading applies equally to this. And in addition it must be remembered, that the damage from these causes will often have occurred at such an early age that it is impossible for the patients to remember anything about it, and the history, when obtainable at all, is only to be got from parents, guardians, or nurses. For example, in the case of whooping-cough nearly every one has had the complaint when a child; and who is to tell which, among all the horrible paroxysms, may have been so severe, or may have happened under such a combination of circumstances, as formidably to overstretch the elastic walls of the air-cells. That such a damage did occur may only come out when, under the influence of time and circumstances, it has become sufficiently aggravated to give rise to some marked symptoms.

It follows, then, that the absence of a clear history of such causes as are included under Class A cannot be taken as satisfactory proof that they did not exist. On the other hand, we often meet with cases in which the history is so clear and connected that it is difficult to make a mistake.

The following cases may illustrate this statement:—

Case LVII.—*Emphysema produced by Laryngitis, aggravated by Bronchial Obstruction latterly. Bronchial Obstruction in partial abeyance at time of Examination from absence of Catarrh.*

Male, aged 44. The breath became short before the occurrence of a cough. It followed an attack of "croup." The croup occurred twenty-five years ago. No regular cough till three years ago. Chest superresonant. Heart's space slightly encroached upon. Expiration slightly prolonged. No bronchial sounds. Heart's sounds feeble and low down. Pulse feeble. Shoulders high. Neck muscles tense on inspiration.

The breathing became short directly after the "croup," at the age of nineteen, and never was other than short afterwards, but had become shorter and shorter and much worse during the last six years, that is three years before he became subject to cough. The attack called "croup" occurring at nineteen may have been Laryngitis, or severe Bronchitis with convulsive cough. Having been called "croup," it was evidently attended with great diminution in the calibre of the respiratory passages or by spasmodic closure of the glottis, and was, therefore, a sufficient cause for strain upon the air-cells and Emphysema. The after history is simply that of gradual increase of the distension by time and by wear and tear. No cough appears to have been set up till three years ago, when he took cold, and since then it had returned with each winter and with each fresh cold, the mucous membrane having become so irritable that colds set in by *affecting the chest* before any other part. There was no hereditary taint and the health was good up to the time of "croup." It should be noted that he was engaged indoors until six years ago, when he took to driving a car, and that this six years corresponds to the period mentioned by him as that in

which his short breath increased, soon to be followed by cough. The conclusion is, that the bronchial membrane became subject to catarrhal thickening through increased exposure to cold, and hence added to the impediment to breathing and to the Emphysema as a consequence. The absence of signs of Bronchitis at the time of examination was evidently accidental, he being free at that time from cold.

Case LXX.*—*Emphysema after Croup.*[1]

C. W., aged 26.—Exaggerated thoracic breathing; depressed epigastrium; chest generally super-resonant, most marked in the middle of sternum, encroaching upon the heart's space above, and in the supra-scapular and axillary spaces; least marked between the scapulæ. Inspiration of fair length, expiration of about the same length, both of nearly equal pitch, except when altered for a time by accumulation of mucus, this being removable by expectoration. Rhonchus and crepitation with expiration and inspiration.

When he was seven years old, on returning from a walk with his parents, he was seized with chills and violent cough quite suddenly. A doctor, seen directly afterwards, said it was croup. He was so ill that seven doctors saw him and he remained ill thirteen weeks. The illness left short breath and some cough, both of which have continued ever since. Before this attack at seven years old he was quite healthy. Since that time he has never been free from cough, and breath has never been otherwise than short; going up stairs or hills, and walking fast, especially aggravate it. A fresh cold is attended with immediate aggravation of his cough and with headache and sore throat. No other causes than cold aggravate the cough. The causes of fresh cold are, especially, getting warm and going out into cold air, and getting wet. He says, and

Cases marked with an asterisk are not included in the tables.

his mother says, that they are sure the croup was the cause of his troubles, for he never had any other illness. Breath and cough worse the last year. Occupation—a schoolmaster up to 21, then civil engineer three years, and the last two a walking-stick maker. Parents living, healthy.

In this case the Emphysema evidently originated in the convulsive cough of croup, and it had gone on for nineteen years with gradual but very slight augmentation. Some amount of bronchial obstruction had occurred at the time of examination, probably from attacks of catarrh; and the increase of short breath and cough last year were perhaps due to this, which may have been aggravated by his new dusty business of a walking-stick maker.

Case XX.—*Emphysema from Convulsive Cough.* To find Particulars see Index to Cases.

Case LXXI.*—*Emphysema from Strain in Lifting*

J. C., aged 56, male, fish porter. Ill five years. Ever since he was a child has had cough in winter, but lost it in summer. The breath was not short till four years ago, when, after lifting a load of about a hundred-weight on to his head and carrying it, he coughed and spat about half a pint of blood. Since that time his breath has been short and has got shorter and shorter. This summer, for the first time, his cough has not left him. No asthma in the family. Neck muscles very tight on inspiration, but they have very little effect on the chest. Apices of both lungs very prominent above the clavicles, and very super-resonant. Upper two-thirds of front of chest very prominent and super-resonant, also the lower parts of the back of the thorax. Heart's space encroached upon from above by super-resonance. During ordinary respiration very little respiratory sound heard, and that

very soft, without rhonchus or sibilus. On forced expiration, a very soft, *low*-pitched sound is heard. After forced inspiration, what little movement of recoil occurs is sudden, and neither expiration nor inspiration is prolonged. In this case there are no signs of obstructed outward tide, therefore, although the expiratory tide has little force, it is soon over, and the sound produced is low in pitch and soft. The history shows that no short breath, therefore no narrowed calibre of air passages or Emphysema, preceded the accident. The suddenness and persistence of the alteration of the breathing, coupled with the single attack of spitting of blood immediately following an expiratory strain, point unmistakably to the sudden production of Emphysema from over-strained and ruptured air-cells, due to lifting too heavy a weight.

Case LXXXIII.*—*Emphysema from Strain.*

J. E., aged 64, smith. Accustomed to work in wells, and to be much exposed to cold and damp all his life, but noticed nothing wrong with his chest till ten years ago, when he fell from a height and saved himself by catching at a rope, on which he hung by one arm for some time. He felt that he had "strained his wind," and also found that he had ruptured himself in the groin. From this time he has been short-winded and subject to cough with every little cold. The short breath and cough have become worse every year, especially the last four. They are partially relieved in warm weather. Neck muscles very tense and prominent during inspiration; very little respiratory movement. Chest very superresonant all over. Inspiration very feeble; expiration long and soft generally, but in some places high-pitched on forced expiration.

Case II.—*Emphysema from Whooping-Cough, the Air Tubes previously narrowed.* To find Particulars see Index to Cases.

Class B, *Order* 1.

Ordinary acts of coughing, when the free expulsion of the air in the chest is prevented by some unexpected obstruction at the moment when the glottis is opened and the expiratory paroxysm has culminated.—I have already referred to this combination of circumstances as a remarkable example of the coincidence of strain upon the air-cells, and absence of uniform external compression (p. 20), that is, of all the conditions necessary for the production of Emphysema. Practically, this is an operation frequently occurring in cases of Bronchitis, Tracheitis, Croup, and the like. Yet it is almost impossible to identify it in the history, for it does not happen with every cough, and the very circumstance which gives it point—the pellet momentarily stopping the way—is a moveable one, of which no trace may be found by any post-factum examination. These, however, are just the occasions on which collapse of portions of lung is apt to occur; for the forcible inspiration which follows the expiratory paroxysm sucks back the foreign body into the smaller air tubes, whence it may fail to be again ejected. When this happens, the physical signs during life may indicate the accident, but more frequently it is unnoticed at the time, and when the collapsed lung-tissue and the Emphysematous cells are found after death, they are supposed, by the morbid anatomist, to be related as cause and effect, instead of as common effects of one cause.

There is, however, a feature which may lead to the suspicion of this cause of Emphysema during life, independent of the question of collapse.

The patients complain that they "cough and cough,

again and again," each time expecting, but failing, to eject the phlegm which they feel to be in their air tubes, but that, a few minutes after the more severe and fruitless coughing has subsided, a trifling cough will bring up easily that which resisted the severe effort. In these cases I believe we may fairly suspect the existence of such a cause of obstruction as I have described, and must regard them as peculiarly liable to an over-stretching of the elastic walls of the air-cells.

A similar coincidence of over-strain upon the air-cells, at the moment when extreme compression is relaxing, occurs in Spasmodic Asthma. But in this case, instead of a pellet of mucus too large or too tenacious to pass the glottis acting as the obstructing cause, the blocking up of the air-passages is due to a sudden accession of spasmodic contraction of their walls in front of the outward tide; in this contraction pellets of mucus may be grasped and thus assist in plugging up the tube which they would not otherwise have been large enough to stop; but without their presence the spasm itself may be sufficient for the purpose. A patient, struggling for breath under an attack of Spasmodic Asthma, is suddenly permitted to get a freer inspiration through a momentary relaxation of the spasm; the presence of fresh air in the chest excites a cough; but, just as the act culminates, a sudden accession of spasm stops the way and throws back the air upon the cells. This occurs again and again in every attack of Spasmodic Asthma, especially towards the close of the attack when the spasm is beginning to give way and mucus is accumulating in the air passages. It is not to be wondered at, therefore, that Emphysema—and that of a general character—is so common a vestige of Spasmodic Asthma. There is another mode in which

this complaint leads to Emphysema, but it will be referred to under a future heading.

I am aware that a very different explanation of the relation between Spasmodic Asthma and Emphysema has been given by Dr. Salter; but although it possesses all the care and complication of detail which distinguish the explanations of that most diligent observer, I must confess that to my mind it entirely fails in explaining the phenomena.

Dr. Salter says, p. 145 of his work on Asthma :—

"Adopting that view of Emphysema so ably advocated by Dr. Gairdner—that it is essentially a *compensatory dilatation* and implicates the neighbourhood of non-expansible lung—I believe the mechanism of the production of Emphysema by Asthma to be as follows:—The bronchial spasm shuts-off the air; the shutting-off the air produces capillary stasis—partial asphyxia; the congested vessels relieve themselves by the characteristic mucous exudation; the continued occlusion of the bronchial tubes, if the spasm does not yield, shuts up this mucus, and prevents its escape, and at the same time, by barring the access of air, prevents efficient cough; so long as spasm lasts, therefore, its escape is doubly prevented by the direct obstruction, and by the want of the natural machinery for expulsion. The tubes affected by the asthmatic contraction thus become obstructed in a twofold way; at first narrowed by spasm, and then completely occluded by mucous infarction. As long as the spasm lasts the escape of mucus is impossible. In the meantime, whatever may have been the length of the attack (and we know that it often lasts for days), the inspiratory muscles are making the most violent efforts to fill the chest, and are, in fact, keeping it in a state of extreme distension. The length of time required for the removal of air from

a lobule from which communication with the external atmosphere is completely shut-off by occlusion of its bronchial tube, I do not know; so I do not know if, *in a single attack of Asthma* any actual lobular collapse could take place, although, in a prolonged attack of some days I feel no doubt that it would. At any rate, the lobules whose bronchi are occluded cannot yield to the distending force of the inspiratory muscles; the whole distension of inspiration is, therefore, spent on those portions of the lungs whose communication with the external air is free. The open lobules have to expand for themselves and their occluded neighbours, and undergo an excessive inflation in proportion to the amount of lung that is non-expansible—in other words, *become Emphysematous*. If we consider how complete the occlusion must be by this double process of spasm and infarction, how protracted Asthma often is, and how violent are the inspiratory efforts that characterise it, I do not think we shall wonder at any amount of Emphysema that is thereby produced, nor at its being one of the commonest organic changes to which Asthma gives rise."

You will observe that this explanation or theory of Dr. Salter's necessitates the belief, first, that asthmatic spasm is a localised affection, limited in its greatest intensity to a certain number of tubes, and leaving other parts of the lung comparatively unaffected throughout the whole of a paroxysm; of which there is not only no proof, but on the contrary every reason for disbelief from the nature and causes of the complaint.

Secondly, this theory necessitates that lobular collapse should be a constant accompaniment of Emphysema and also of Asthma, and that the Emphysema of asthmatics

should be of the lobular kind; neither of which conditions is to any large extent consistent with experience.

Thirdly, if such complete and permanent infarction of bronchi as is required by this theory takes place during an asthmatic paroxysm, it is strangely inconsistent with the rapidity and completeness with which a paroxysm of asthmatic dyspnœa clears off directly the spasm yields.

Class B, *Order* 2.

Ordinary acts of sneezing and of nose-blowing, opposed by considerable obstruction of the nasal passages, and frequently repeated.—I have already given the reasons why these circumstances must be included among causes of Emphysema (see Lect. 1), and that they are competent to produce strain upon the air-cells can hardly be doubted by anyone who will carefully watch his own sensations when suffering from severe nasal catarrh in its tumid and obstructive stages. The backward pressure of the air can be plainly felt at all parts of the chest during sneezing and nose-blowing, and the harder the blow, or the more violent the sneeze, the more forcible and general is the sense of distension.

If these are to be included as causes of over-distension of the air-cells, it follows that we must consider a history of severe and repeated nasal catarrhs as an important feature in a case of Emphysema. It appears to me to be one of the conditions especially calculated to produce *general lobar Emphysema*, the class of cases which have been regarded as so difficult to account for, that Dr. Waters,—after conducting a very excellent argument to prove that expiratory efforts are the effectual means of producing

Emphysema, that inspiration is incompetent to produce it, and that the existence of degeneration of the air-cells is not supported by facts,—actually deserts his vantage ground, and, resorting to an imaginary state of degeneration of the air-cells, assumes the possibility of their distension by *in*-spiration, which he then asserts to be the cause of lobar Emphysema: so puzzled is he to account, in any other way, for general distension of the air-cells (Waters on Emphysema, &c., p. 52).

The possibility of nasal catarrh becoming a cause of a severe disease in the air-cells does not appear to have occurred to anyone. I suppose it has been thought that so common and undignified a complaint as "a snivelling cold" was not worthy to be the cause of such an important disease as Lobar Emphysema, forgetful of the trite but true adage, "Great events from little causes spring."

Case LXXII.*— *Emphysema from Nasal Catarrh; Loss of Expiratory Power.*

T. W., aged 68, bricklayer, November, 1864.—Very weak; chest thin, large-boned, distended abnormally; raised in mass with very little expansion during inspiration; resonance generally increased and high-toned; heart's space encroached upon from above; inspiration high-pitched, feeble; occasional rhonchal expiration, soft, long, feeble, with occasional high-pitched sibilus; heart's sounds sharp and thin-walled; epigastric impulse; very little expectoration. Has never had much cough, but the breath has been getting short for five years. He has been long subject to frequent, almost constant nasal catarrh, with much sneezing, and to these he attributes the short breath. Never had any other illness. Every fresh cold in the head

makes the breath shorter while it lasts, and when it goes, although the breath is better again, on the whole it gets worse and worse with each successive attack. Not suffering from cold at present time.

In this case careful inquiry could discover no other rational cause for Emphysema than the catarrh, and that had been a very marked feature, giving the patient the impression that it was the cause of all his troubles.

It is probable that, except during an attack of fresh cold, the obstruction to the outward tide had not been very great, but it was getting greater and greater.

(See Post-nasal Catarrh).

Case B, *Order* 3.

Ordinary respiration when the outward tide is sufficiently obstructed by narrowed naso-pulmonary air passages to require *muscular expiration*.—This is "the head and front of the offending;" for all forms of catarrh and some other analogous causes are competent to narrow the air passages at some part of the mucous tract, beginning at the nose and going down to the remotest bronchi.

No doubt catarrh may occur without producing such an effect; in proportion as it is readily resolved, the effect is avoided.

We are able easily to watch the progress and effects of catarrhal inflammation when it occurs in the conjunctiva. This mucous membrane may be actively inflamed, and yet be restored to its pristine clearness and tenuity; and such attacks of inflammation may occur again and again, and still leave no thickening of the membrane.

But such is not the usual course of events. It more

frequently happens that if the attacks of catarrhal conjunctivitis are often repeated they become more and more chronic in their character, each time being less readily resolved and more easily re-excited, indicating a less complete cure, until the tenuity and clearness of the membrane are interfered with. What happens here is precisely what happens to all the mucous membranes of the body if subjected to irritation, whether from cold or from other causes. Indeed, the eye irritated by inverted lashes or by a granular lid presents us with an example of gradual thickening of mucous membrane from other causes than cold, just as the naso-pulmonary mucous membranes of the snuff-taker, the stonemason, and the brushmaker present examples of thickening from the irritation of snuff or of dust.

Case XXIV.—*Irritation of Dust, producing Bronchitis and Emphysema.*

D. S., aged 40, male. The breath had been short four years, and became so one year before the cough began. There was no illness at the time; the previous health was good; but the breath had not ceased to be short since it began to be so. The cough came on with copious expectoration twelve months after the breath began to be short, and continued more or less ever since, except once, when it had left for a short time about two years after its commencement. Fresh colds always affected the chest first, and were attended with copious expectoration, and were especially apt to be produced by wet feet. The patient was naturally weak, but had no hereditary taint, except rheumatism on the father's side. He had been for twenty-one years a brushmaker, which is a dusty trade.

This history leads to the opinion that the Emphysema

was a secondary affection; that the pulmonary mucous membrane had become irritated and thickened by the dust of his trade, and that this was followed by Bronchitis and further thickening of membrane, as evidenced by prolonged wheezing expiration.

Case LXXIII.*—*Thickened Naso-pulmonary Mucous Membrane in a Stonemason.*

T. C., aged 33, male, stonemason, Nov. 8th, 1865. Irritable cough, especially tickling in the throat; expectoration of whipped-up froth; breath short. Had a cold followed by cough last winter, and the breath has been somewhat short ever since, not short before. Cough was better or well during summer, but three months ago came back with a cold, and has been worse this year than last, and breathing is shorter. He gets fat, is temperate. No consumption or asthma in the family. He looks rather bloated. Says his breath and cough are better lying down than up. Heart sounds normal; chest sounds normal, except some transmitted harshness in large bronchi; apices very resonant, as compared with lower lobes posteriorly which are rather deficient in resonance. Larynx and tracheal sounds very harsh, and expiratory sounds high pitched on forced expiration. Mucous membrane of pharynx somewhat tumid, and the follicles prominent. Says he feels all his trouble in the windpipe.

In this case the upper part of the naso-pulmonary mucous membrane had been long irritated by the stone-dust, which the man inhaled at his trade, and it was therefore easily and severely affected by catarrh when it occurred, so that the membrane remained thickened after the cold left, and was readily susceptible to a renewal of

catarrh which was attended with increased thickening of the membrane. His short breath was evidently due to the narrowed tubes. These were beginning to act as causes of distension of the air-cells at the upper parts of the chest.

Fortunately, mucous membranes, like the skin, have been endowed with a property somewhat analogous to that possessed by erectile tissues. They can become highly turgid with blood, and rapidly return to their less turgid condition without leaving any traces of their former injection. In the skin we call this "blushing," and the mucous membrane, which resembles the skin in so many other points, resembles it also in this, that it can blush.

This is a very important point to bear in mind, as it explains many phenomena connected with affections of the air passages, which otherwise might very much puzzle us, and which have undoubtedly been stumbling-blocks to many.

The analogy, too, between the mucous membranes and the skin, in this matter of blushing, is kept up in another important respect. If the turgidity of the skin is but transient, it may be accompanied by no perceptible augmentation of secretion; but if it continues, it leads to increased secretion, and with this the turgidity subsides. The same thing happens with the mucous membranes; they may blush or flush, and return to their normal condition without leaving any effect; but if the flush or vascularity continues beyond a certain time, increased secretion is the result, and with this comes relief to the turgid membrane. It is more than probable that no thickening or other damage occurs in the membrane, however often it may flush, unless the turgidity persists long enough, or

is sufficiently pronounced to require increased secretion for its relief. Clinical observation leads me to this opinion.

But then, practically, if a mucous membrane is called upon to flush or become turgid with undue frequency, it loses its capability of quick restoration to its normal state, and gradually the flush becomes more permanent and more pronounced, and increased secretion becomes necessary for its relief. The relief thus afforded becomes less and less complete, and the excitability of the membrane to fresh flushing is augmented, until it becomes more and more hypertrophied.

One of the functions of the secretion from mucous membranes is to assist in removing foreign matters from their surfaces. These membranes, therefore, have been endowed with an especial susceptibility to irritations applied to their surfaces. Hence it happens that, although they may suffer flushing from causes proceeding from other sources, as, for example, qualities of blood circulating in their vessels, and sympathetically with other organs through the nervous system, these causes do not so readily excite increased secretion as irritations applied to their free surfaces. Now, it is exactly upon the free surfaces of these membranes that causes of catarrh are most readily applied. Hence catarrh of mucous membranes is especially attended with morbidly increased secretion, and its too frequent repetition is productive of thickening of the membranes affected.

Of all the causes, therefore, of thickened naso-pulmonary mucous membrane and consequent narrowing of the respiratory tract of tubes, *catarrh* is that which acts most frequently and prejudicially.

In the same rank with catarrh, produced by the contact of an atmosphere meteorologically irritating to the air

tubes, must be placed the effects of those mechanical irritants which in various trades are inhaled with the air, as in the cases already referred to and also in many others.

Then there is the catarrh produced by sympathy with the cutaneous surface. Then the effects of rheumatic, syphilitic, typhoid, gouty and other poisons in the blood circulating in the lungs and acting as irritants from within; and in the same rank come the effects of ill-digested, ill-assimilated foods poured into the blood from the intestines, and of poisons absorbed from the stomach. I have seen nettlerash of the bronchial and faucial mucous membrane, threatening suffocation, proceeding from the same causes as nettlerash on the skin, and in the same person, affecting at one time the cutaneous, at another the mucous surfaces.

In my opinion the whole of this series of phenomena in the mucous membranes of the air passages—the transient flush, the more permanent turgidity resulting in secretion, the increased susceptibility to the repetition of these states, and the final hypertrophy of the membrane—are illustrated by many cases of spasmodic asthma. From one or more of the causes competent to produce flushing of the bronchial mucous membrane being too often repeated, an undue sensitiveness to the influence of such causes is induced. At first the flushing is but transient, and produces, through the temporary tumidity of the membrane, a slight dyspnœa, quickly passing off as the flush subsides. By-and-bye, the intensity of the flush becomes greater, and either from this cause alone or from the superaddition of some cause of nervous depression or excitement, spasmodic contraction of the bronchial muscular fibres accompanies the flush. This, too, may be so transient as to pass

away without increased secretion taking place from the membrane, and thus a paroxysm of asthma comes and goes, like the blush on the countenance, as it were "by magic." But more intense and abiding turgidity brings things to a pass beyond the power of the vascular structure to recover itself by resolution, and an attack of asthma is produced, of which the spasmodic contraction and dyspnœa are obstinately persistent, until, at length, the membrane relieves itself by increased secretion, the irritability of the muscular fibres subsides, and the paroxysm passes off with expectoration.

Case LXXIV.*—*Case of Flushing of Naso-pulmonary Mucous Membrane, sometimes in one part, sometimes in another; sometimes ending in sneezing and secretion from the nose and frontal sinuses; sometimes in dry spasmodic asthma passing off by resolution; sometimes resulting in humid spasmodic asthma passing off with expectoration.*

I have long had the opportunity of watching all these phenomena in a very interesting case, which I have attended for the last ten years.

This gentleman enjoys good general health, is between thirty and forty years of age, of active and temperate habits, but rheumatic constitution. He is, and has been since his youth, subject to slight attacks of spasmodic asthma, and to severe running and sneezing colds in the head. These are produced by a number of different causes, of which the following are the principal and most undoubted:—Damp feet; draughts of cold air on the face; hot rooms, if the blood gets into the face and head; mental occupation, if continued after the head and face get hot and the feet cold; an extra glass of wine if it flushes the face; effervescing drinks if taken when the gas

is escaping briskly; bright sunshine; east winds; getting over-heated by exercise so that the face gets very hot; any food that disagrees with the stomach; sleep; an excess of rheumatic acid in the system.

The usual effect of any one of these causes is to produce congestion and tumidity of the nasal mucous membrane, which goes on increasing till violent sneezing is produced, and the relief comes in a profuse, very watery discharge from the nose, eyes, and posterior nares. This lasts for an hour or two, and the whole attack subsides and gradually passes away. But if, when the attack is in its first or flushing stage, the forehead and nose are bathed with cold water, or freely exposed to cold air, the sneezing and coryza are postponed, and may be altogether kept off; but then an attack of spasmodic dyspnœa is produced, for which there is no relief, except either a free expectoration or a re-excitement of the former symptoms of sneezing and running at the nose, which will then remove the chest symptoms. When the patient is unusually rheumatic, and the secretions very acid, the tendency to recurrence of coryza or asthma is very much increased, but is certain to be relieved by alkalies. The attacks of coryza can be kept off almost indefinitely by small doses of morphia; but this suppression is always followed by an increase in the tendency to spasmodic asthma, the attacks getting more frequent and severe till the morphia is withdrawn, and the coryza allowed to have its way.*

But the coryza and the asthmatic dyspnœa terminating in expectoration, are only the fully developed forms of numerous slighter attacks of flushing of the mucous membrane, which give rise, at one time to temporary stuffiness of the nasal passages, and at another to temporary stuffiness of the bronchial passages with dyspnœa, and then pass off, as if by magic, without any increased secretion.

We see, therefore, in this one case an illustration of both

* See Appendix III. for new Remedy for Sneezing.

the humid and the dry asthma, so called; we see that both can be produced by different stages or degrees of the same pathological states, and by the same causes; that these causes may affect at one time one part of the naso-pulmonary mucous tract, and at another time a different part, and that one part is capable of acting for the relief of another.

I have never seen another case in which all these phenomena were so palpable and so conveniently combined; but I have seen many analogous cases, in which they might be witnessed to a greater or less extent. In fact, you will find that all cases of spasmodic asthma bear certain analogies to this case. The repetition of these phenomena, like the repeated catarrhs and other sources of mucous irritation which I have mentioned, leads step by step to hypertrophy of the lining membrane of the air tubes and narrowing of their calibre, and hence at last to Emphysema.

We must then consider, among important features in the clinical history of a case of Emphysema, the occurrence of any of these causes of too great and too frequent turgidity of the naso-pulmonary mucous membrane, because they are causes of narrowing of the air passages.

The following extracts from cases in which there were physical signs, both of Emphysema and of Bronchitis (see Index to Cases, WHITE GROUP), will show the extent to which these causes of Emphysema were discoverable in the clinical histories.

In nineteen of the cases, the short breathing and the cough came on simultaneously, and the nature of the first attack was thus described:—

Case V.—A bad attack of Bronchitis, which left the breath short. No other illness. Previous health good. Never free from cough since.

Case IX.—An attack of inflammation of lungs fourteen years ago, after which breath was found to be short. No other illness. Never free from cough since.

Case XIV.—Nine years ago a bad cold and cough, which left breath short. No other illness. Cough returns every winter. Better in warm weather.

Case XV.—Twenty years ago a bad tickling cough which left breath short. Never free from cough since.

Case XXVII.—Ten years ago severe influenza cold and cough, which left short breath. No other illness. Never free from cough since.

Case XXX.—Two years ago, while suffering from cough, with tickling in throat (Bronchitis) walked very fast and brought on short breath. Has been free from cough once since, under treatment, but not free from short breath. Inclination to spasmodic dyspnœa at night.

Case XL.—Twelve years ago hacking cough, and much phlegm, which left short breath. Both cough and breath have been better and worse, according to weather, ever since.

Case XLII.—Twenty-eight years ago cold in the chest, with tightness and cough. Never free from cough and short breath since.

Case XLIV.—Nine years ago influenza cold, debility, and cough, with short breath. Never free from cough and short breath since.

Case XLVII.—Nine years ago cough and tightness at chest, from exposure to cold. Never free from cough since. Breath better in warm weather, but always short.

Case L.—Cold and cough twenty years ago, leaving short breath, but breath was better during the first five years, worse since. Never free from cough.

Case LI.—Influenza and cough ten years ago. Bad every winter since, breath short, but better in summer.

Case LII.—Cold and cough nine years ago, aggravated since by every cold, which is very often. Breath short, but better in summer.

Case LV.—Four years ago bad cough and cold, from wet feet; left short breath. Never free from cough since.

Case LVI.—Violent cough, with pains in chest and sides; left short breath. Cough returns every winter since. Better in summer.

Case LVIII.—Sixteen years ago bad cold and cough. Left short breath. Breath has continued short. Cough better in summer, worse every winter.

Case LIX.—Twelve years ago severe influenza and cough. Cough and breath aggravated by every cold since, but both better in summer.

Case LXI.—Five years ago cold and cough from getting wet. Better and worse since, but breath always short.

Case LXII.—Age 18. Had whooping-cough, measles, and scarlet fever, before three years of age, and breath has been short ever since. Cough with every fresh cold. Never free.

In three of the cases the breathing became short within one year after the cough began. The first attack of cough, and the setting-in of short breath, are thus described:—

Case XXXIV.—Twelve years ago cough came on, attended with nervous debility, and, soon after, the breath began to be short in winter. Never free from cough summer or winter for twelve years; but breath has not been short in summer till last four years. Cough has gradually got worse and worse, aggravated by change of weather.

Case XXXVIII.—Five years ago cough began, with inflammation of chest from cold. Previous health good. Breath first became observably short twelve months after. Cough never absent, but worse in winter. Breath not short in summer.

Case XLI.—Three years ago cough began, with tightness of chest and hard breathing. It has been better or absent in summer, but brought back with slightest cold. Breath not short till twelve months after cough, and has ceased to be short in the middle of summer.

In five of the cases, the breathing did not begin to be short till more than one year after the cough came on, and the nature of the first attack is thus described :—

Case XXII.—Twenty-three years ago cough began in autumn, more in the day than night. Nothing else the matter. Cough often absent in summer, but returning every autumn. Breath did not get short till thirteen years after cough began. No other illness at time except inflamed veins in legs. Has been short ever since, getting worse and worse.

Case XXVI.—A little over four years ago a very bad cough set in, with cold and violent shivering, and had been renewed with every fresh cold, though absent in summer. The breath began to be short from one to two years after first attack of cough, and had been better and worse according to weather, ever since.

Case XXXIII.—Liable to coughs and colds for years, a bad attack of cold, violent cough, and swollen glands two years ago. Cough ever since. The breath did not get short till six months ago, and is not observably short now. Never free from cold.

Case XXXV.—Twelve years ago cough began, and got gradually worse, though sometimes absent in summer.

Breath became short six years ago, after confinement with twins. Short ever since, probably from the strain of parturition.

Case XLVI.—Cough began in early life, gradually getting worse each winter; better in summer. Breath became short about twelve years ago (many years after cough) during a cold, breath not short when free from cold.

Class B, *Order* 4.

Ordinary acts of coughing, sneezing, or nose-blowing, when some portions of the air-cells are deprived of their normal circumferential supports.—If collapse of the lung ever acts as a cause of Emphysema, it must, I think, be included under this heading. As it was seen in the case of M. Groux, to which I have already referred (p. 17), that during forced expiration the portion of lung deprived of external support by the deficiency of the chest-wall puffed up and bulged into the fissure, it is possible that the same thing might happen to a portion of lung deprived of its circumferential support by the collapse of its neighbouring lobule. But I shall have occasion to refer to this point by-and-bye.

I have now enumerated some of the principal conditions, for evidence of the past or present existence of which we have to search in cases of Emphysema. But I must not leave this part of the subject without pointing out the importance of *caution* in making this search. It generally happens that the only symptom we have to guide us in our enquiries as to when Emphysema first existed, is the shortness of breath. We endeavour to ascertain at what period in the history the breath was first perceptibly short; and we shall be led to very mistaken conclusions, unless we take great pains to ascertain whether other cir-

cumstances existed at the time the breath became short, which were more likely to have been its cause than Emphysema. The neglect of this precaution has, to my knowledge, often led to wrong theories as to the causation of Emphysema in particular cases, and might easily have done so in some of those which I have recorded.

The following table shows the relation, in point of time, between the beginning of short breath and the beginning of cough in fifty-eight cases :—

TABLE I. (See Index to Cases)	COUGH BEGAN.						
	Before Short Breath in 36 per cent. of 58 cases.			Same time as Short Breath in 47 per cent. of 58 cases.	After Short Breath in 17 per cent. of 58 cases.		
	More than 5 years before Short Breath.	From 1 to 5 years before Short Breath.	Less than 1 year before Short Breath.	Same time as Short Breath.	Less than 1 year after Short Breath.	From 1 to 5 years after Short Breath.	More than 5 years after Short Breath.
White 33 Cases	5*	1	3	19	3	1	1
Per Cent. ...	15	3	9	58	9	3	3
Red 18 Cases .	7*	0	0	8	1	0	2
Per Cent. ...	38			45	6		11
Yellow 1 Case	0	0	0	0	1	0	0
Per Cent. ...							
Blue 6 Cases ...	3	2	0	0	0	0	1
Per Cent. ...	50	33					17
Total 58 Cases	15	3	3	27	5	1	4
Approximate Per Cent.	26	5	5	46	9	2	7

* In one of these cases the Breath was reported not short.

NOTE.—In this and all the Tables, the figures are as nearly correct as was possible, without introducing decimals.

This table shows that in the cases where Emphysema existed—viz., the Yellow, Blue and White Groups—the

cough began *before* the short breath in 35 per cent., and came on simultaneously with it in 48 per cent., making 83 per cent. in which the cough either preceded or accompanied the beginning of short breathing.

In the cases of Bronchitis without Emphysema—(see Index to Cases, Red Group)—in which, therefore, the short breath could not have been due to Emphysema—it came on simultaneously with the cough in 45 per cent., so nearly the same proportion as in the cases of Emphysema as to make it probable that the short breath in those cases, at least in its commencement, was more dependent on the Bronchitis than upon the Emphysema.

But the greatest interest with regard to the origin of Emphysema attaches to seven cases in which the cough did not begin till after the short breath. These were Cases II., XVII., XXIII., XXIV., XXVIII. in the White Group; Case XX. in the Yellow Group; and Case LVII. in the Blue Group. It is in such cases as these that the Emphysema is apt to be set down as an idiopathic affection, for want of more careful scrutiny into their history. On making a very close examination, however, we find the following explanations of the relation between the beginning of cough and of short breath.

Case LVII. has been already referred to (see Index to Cases); Emphysema was produced by Laryngitis.

In Case II. the short breath, which preceded the cough by thirteen years, was attributable to catarrhal thickening of the naso-pulmonary mucous membrane, consequent upon measles; while the cough came on with whooping-cough; and the Emphysema was evidently due to the convulsive cough occurring in a person with narrowed air passages.

In Case XVII. the short breath, which was said to have

preceded the cough by five years, was found to have only been present during attacks of nervous palpitation, which occurred at a time of disturbed health, due to the cessation of menstruation, and had nothing to do with the chest affection. The amount of Emphysema was very slight, and probably dated from an attack of Influenza and Bronchitis, with which the cough commenced.

In Case XXIV. the patient was a brushmaker, and the short breath which was coming on for 12 months before the cough began, was due to thickening of the naso-pulmonary mucous membrane, produced by the inhalation of dust from the bristles used in his trade. The cough came on as the irritation got worse and worse, and the Emphysema had been gradually produced by the narrowed air passages.

In Case XXIII. the cough and short breath had both existed about ten years; but the short breath had preceded the cough by a slight interval. It came on with a bad cold and was due no doubt to a catarrhal tumidity of the mucous membrane, for it ceased to be short when warmer weather came. Attacks of Cold and Bronchitis had returned every winter and gradually produced the Emphysema discovered on examination.

In Case XX. the Emphysema was evidently produced by a very violent attack of convulsive coughing, brought on by an unusually bad London fog, and by subsequent attacks of a similar kinds excited by fogs. The short breathing said to have preceded these convulsive coughs was found to have occurred during an attack of piles and palpitation of the heart, accompanied by general illness. The patient was a tailor and the heart was apparently fatty.

In Case XXVIII. the short breath which preceded the cough was only due to gradual increase of bronchial congestion, which culminated in broncho-pneumonia when

the cough came on. The Emphysema was altogether a subsequent affection.

It appears, then, that in these seven cases in which the short breath preceded the cough, a close enquiry discovers in each case a rational explanation of the phenomenon quite consistent with the expiratory theory of the production of Emphysema.

Table II. shows that in the fifty-eight tabulated cases the average duration of *short breath* at the time of examination was $8\frac{3}{5}$ years, the maximum duration 28 years, the minimum 1 year; whereas the average duration of the cough was $12\frac{3}{5}$ years, the maximum duration 50, the minimum 1.

The average age at which the short breath began was $32\frac{1}{10}$ years; the average age at which the cough began was $29\frac{1}{10}$ years.

Hence, allowing for slight errors which unavoidably creep into minute statistics of this kind, and striking a balance between the two results, we arrive at the conclusion that in the series of fifty-eight cases the cough preceded the short breathing by between three and four years on an average. The details of the several groups are seen in the Table.

Table II. (See Index to Cases).	Short Breath.						Cough.					
	Duration of Short Breath. In years.			Age when Short Breath began. In years.			Duration of Cough. In years.			Age when cough began. In years.		
	max.	min.	aver-age.	max.	min.	aver-age.	max.	min.	aver-age.	max.	min.	aver-age.
White 33 cases	28	1	10	60	1	31	46	1	11	66	1	29
Red 18 cases .	20	1	7	52	16	32	50	1	17	39	4	25
Yellow 1 case			1			59			$\frac{3}{4}$			$59\frac{1}{4}$
Blue 6 cases .	25	1	7	47	10	34	20	3	10	40	28	37
Total 58 cases	28	1	$8\frac{3}{5}$	60	1	$32\frac{1}{10}$	50	1	$12\frac{3}{5}$	66	1	$29\frac{1}{10}$

LECTURE III.

Clinical evidence of causes of Emphysema to be found in the examination of patients.—Physical signs of narrowed air-passages.—Qualities of sound.—Importance of pitch.—Alterations in pitch of expiratory and inspiratory sounds; their diagnostic value.—Illustrative Cases.—Objections to the degeneration, collapse, and inspiration theories of the production of Emphysema.—Importance of the expiratory theory in relation to treatment.

We have seen the importance of getting accurate particulars of the early history of these cases, in order to avoid false conclusions as to their nature and origin. And, without pretending to have exhausted the subject, I believe I have now laid before you a sufficiently comprehensive list of the circumstances capable of overstretching the air-cells, either *gradually* or *at once*, and for which, therefore, we have to search in the clinical history of cases of Winter Cough accompanied by Emphysema of the lungs.

I shall now pass on from the history of these cases to the clinical features which they present on examination.

I have shown you that narrowing of the naso-pulmonary air passages holds the most important place among causes of Emphysema; and I now come to consider the means which we have at our disposal, by which to ascertain, during life, whether or not the respiratory tubes are narrowed in any given case. I shall be able to point out some very simple physical signs, the importance of which does not appear to have occurred to other observers than myself, as they are not mentioned in books, but which are, I think, capable of satisfactory demonstration.

I refer especially to certain modifications of *pitch* in the inspiratory and expiratory sounds.

In order to give these their proper meaning and value, it is necessary to bear in mind a few acoustic details. I hoped to have been able to present you with the results of some experiments on this subject with which I have long been engaged; but they have proved more complicated than I anticipated, and I have not been able to get them finished in time for these lectures.[1] I shall not therefore trouble you with more than a very brief recital of the recognised rules with regard to pitch which are necessary to the present question. (For further information on Auscultation and Percussion, see my work "Demonstrations of Diseases in the Chest and their Physical Diagnosis.")

Of all the qualities of sound, except loudness, pitch is that most easily and unmistakably distinguished. It refers, as you are aware, to the differences popularly known as "high" and "low;" differences which if they are at all wide are caught at once, even by the uneducated ear, and which to a good musical ear properly educated are distinguishable when reduced to a mere fraction.

For this reason I attach the greatest practical importance in physical diagnosis to all modifications of *pitch*.

Timbre is a most valuable attribute of sound, and when thoroughly understood is competent to give very important indications in disease; but it is far more subtle in its nature than pitch, and therefore more subject to be misunderstood. Its appreciation by the ear is less amenable to education, and its modifications are due to such a variety of occult causes that it is beset with sources of fallacy, and above all, its characters are exceedingly difficult to describe.

Pitch, on the other hand, is not only easily detected and easily described, but there is one constant condition

[1] I regret that I have never had leisure in which to follow up the acoustic experiments referred to.

upon which all its modifications depend, viz., the rate of vibration. All continued sound is but a repetition of impulses, and the pitch depends upon the number of these which occur in a given time. The slower the rate the lower the pitch: the more rapid the rate the higher the pitch. You are aware that this applies equally to all sonorous bodies, and that, although the pitch of a sound elicited from a vibrating string may be raised to the same extent by either halving its length, quartering its weight, or quadrupling its tension, yet that this is only because by each of these operations the rate of vibration is affected in an equal degree. And when sounds are produced by the vibrations of air contained in tubes, the same effects are obtained by changes in the length and calibre of the tubes, and by the open or closed condition of their ends, as by alterations in the tension, weight, and length of vibrating strings. All that we have to bear in mind, then, is, that *high pitch and rapid vibration*, and *low pitch and slow vibration* are inseparable.

In tranquil normal breathing it is difficult to detect any expiratory sound when listening to the chest-wall; but by giving a very slight voluntary character to the expiratory act, a sound is at once heard. Now this sound will be always found to be of much *lower pitch* than the *in*spiratory sound, if the lungs and air passages are healthy. And the question arises, Why is this? Do not the inspiratory tide and the expiratory tide pass through the very same tubes, through tubes of the same calibre, and therefore ought not each to produce a sound of the same pitch? That they do not produce sounds of the same pitch is due principally to the difference of *rate* in the two currents; although, no doubt, something is due to the altered temperature and volume of the expired air. The inspi-

ratory current is much faster than the expiratory; and as the same volume of air has to be drawn through the tubes in a shorter space of time, the vibrations set up are more rapid, and the pitch is proportionately raised. That such is the case is subject to the simplest proof, for we have only to make a patient snatch a sudden forcible breath, and so increase still further the *rate* of the inspiratory tide, and the pitch will rise proportionately. On the other hand, if a gentle slow inspiration is taken, the pitch will sink; and then by a sharp, forced expiration, the expiratory sound may be made to *rise* in pitch till it is even higher than the previous *in*spiratory sound; or the same experiment can be tried with a common bellows; the pitch of the sound produced by the rush of air through the nozzle can be raised or lowered by increasing or diminishing its rate.

If, then, in the natural state of things, the inspiratory sound is of higher pitch than the expiratory, it is clear that any alteration in this relationship must proceed from some change in the physical conditions, and ought to excite our attention.

It is evident that if the alteration of pitch in either of the sounds is due simply to an increase of rate in the current of air, other things being normal, the duration of the sound should diminish as the pitch increases; for a shorter time must be required to drive the same volume of air through the same tube at a rapid than at a slow rate. We see this exemplified when a chest which is not highly elastic is forcibly expanded, it recoils with suddenness and force: whereas a highly elastic chest expands freely with a less exertion of force, and recoils more slowly and gently. In the first case, the expiratory sound will be short and high pitched; in the second case,

longer and of lower pitch. Exactly these two states and their results are seen in the chests of girls and of boys, especially in the front and upper parts of them. I have often watched this when examining large numbers of boys and girls, one after the other, for the Royal Albert Orphan Asylum.

Make a boy take a deep breath while you listen to the front of his chest, and you will find the succeeding *expiration* short and high-pitched. Make a girl do the same, and the expiration will be longer, softer and lower-pitched; and if, as sometimes happens, you find a boy with a chest like a girl and a girl with one like a boy the usual phenomena will be reversed.

I may mention, in passing, that this is, in my opinion, the explanation of the much discussed question of the cause of the perceptible expiratory sound in the earliest stages of tubercular deposits in the lungs. The resiliency of the lung is interfered with, the chest expansion is interfered with, and a shorter and more sudden recoil occurs, driving the air through the tubes with more force and at a greater rate than usual, and consequently raising the pitch of the expiratory sound so as to make it audible. A certain rate of vibration is necessary to produce sound at all, and it may be that the rate in healthy normal expiration is not sufficient to be sonorous; whereas, the increase of rate to which I have referred, gives vibrations rapid enough to produce sound. I am not here speaking of that still greater change in the expiratory sound due to obstruction to the outward tide, which occurs in more advanced disease, but of a change in character which long precedes this, and is much more important to identify.

Well then, the first and simplest cause of a rise in pitch in either of the respiratory sounds is an *increase in the*

rate of current; and with this, if all else is normal, a *decrease in duration* must correspond.

But suppose the pitch of one of the sounds is raised and at the same time the duration is not decreased, then there must be a diminution in the calibre of the tube through which the current passes. For given two equal volumes of air driven at the same rate through two orifices, either they will pass in the same period of time or the sizes of the orifices must be different. Therefore *an expiratory sound which is both long and high-pitched* must be due to a narrowing of the orifice through which it has to pass.

But at this point a difficulty occurs which for a long time puzzled me very much to explain.

The difficulty is this: How can it happen that a change in the calibre of a respiratory tube, through which both the inspiratory and expiratory currents have to pass, should affect one of these currents more than the other? For instance,—if a bronchial tube is narrowed, why does it not raise the pitch of the inspiratory and expiratory sounds in the *same proportion*, and thus maintain the normal relation between their pitch? The explanation is that which I gave (page 14) when speaking of backward pressure upon the air-cells, viz., that the *moving powers* in the two cases do not remain the same. In normal respiration, the expiration is performed by the elastic recoil of the lung-tissue followed up by the elastic recoil of the chest-wall; but directly there is an impediment placed in the way of the expiratory current, the expiratory *muscular* system is called into play, and thus a new element is added to *expiration* which is not added to *inspiration*. An additional force of a new kind drives on the current in one case and not in the other. But with this new element of force

comes that other most important one to which I have also referred, viz., that whereas all *inspiratory* efforts tend to expand the chest, and, by taking off the superincumbent pressure, to dilate the air tubes, all *expiratory* efforts tend to compress the lungs and consequently favour the contraction of the tubes, and this becomes especially the direction in which *muscular expiration* acts; the air-cells which lie upon and in the neighbourhood of the air-tubes are pressed upon them. The operation of forced expiration, therefore, acts in the direction to favour and increase the *narrowing* of the expiratory current, and, to increase the pitch of its sound, out of proportion to that of the inspiratory sound.

There is a very interesting exception to this rule which serves to prove it. In spasmodic asthma, the *inspiratory* sound is raised in pitch more than the expiratory. This is due to the spasmodic contraction of the muscular fibres of the bronchi, excited by the attempts to inspire fresh air. They, in fact, offer a direct opposition to the normal inspiratory act and almost paralyse it. They narrow the passage of the inspiratory current, and its sound is raised in pitch, in proportion to the rate at which the inspiratory efforts succeed in drawing it through the narrowed passages. But these spasmodic contractions do not, as a rule, offer the same obstruction to the outward tide; the tubes having been forced to yield to the inspiration, allow the air, now warm and charged with carbonic acid, to escape with less opposition, renewing the vigour of their contraction at every new attempt to draw fresh air through them.

We have then two valuable diagnostic physical signs plainly demonstrated:—

1. A high-pitched long *ex*piratory sound must mean

contraction of the respiratory tubes independent of spasm.

2. An abnormally high-pitched *in*spiratory sound, not accompanied by a corresponding change in the expiratory sound, must mean spasmodic contraction of the air passages.[1]

I will mention another clinical fact which, while it presents a third diagnostic physical sign, confirms the correctness of the other two. If a contraction takes place in a respiratory tube, which is *rigid* in its character, and so situated that it cannot be favoured by either inspiration or expiration, the pitch of the inspiratory and expiratory sounds is alike affected by it. This may be best observed in affections of the larger air passages, such as rigid contractions of the openings of the larynx, compression of the trachea and bronchi by tumours, and the like.

Everything connected with the signs and symptoms of disease is beset with sources of fallacy; and these physical signs are no exceptions to the rule.

But the principal sources of fallacy in this case are not very difficult to eliminate. They consist in the influence of tongues and plugs of secretion adhering to the walls of the tubes, which by temporarily narrowing the passage at the point where the plug is lodged and by the vibration of the free ends of the adherent tongues, give rise to deceptive elevations in the pitch of one or both of the respiratory sounds. It is evident that these are moveable causes; and therefore, before deciding upon the meaning of any alteration in the pitch of the respiratory sounds, the patient should be made to clear the chest by breathing and coughing sharply several times; after which the chest

[1] The great importance of these aids to diagnosis, which I first taught when these Lectures were delivered in 1865, has been since confirmed by daily experience.

should be examined again. If the alterations of pitch are not essentially changed in position or character by the coughing and sharp breathing, it is pretty certain that they are not due to such moveable causes as plugs and tongues of mucus.

In the case of spasmodic contractions, it occasionally happens that the spasm is so capricious that it suddenly gives way during inspiration, and closes upon the *ex*piratory tide; but this reverse of the general rule is but an exceptional case, and is not likely to recur in several consecutive respirations.

Again, we must be on our guard against *transmitted sounds*. A sound or quality of sound generated in one part of the naso-pulmonary tract, may be transmitted through other portions of it. Even changes of sound produced in the posterior nares may be heard down the bronchi; and changes in the quality of sounds generated in the minute air tubes may be heard in the larger passages. The most common of these occurrences, however, is that qualities of sound produced by affections of the larynx are transmitted down the trachea and bronchi, and may be mistaken for changes having their origin there. But really this source of error may be avoided with tolerable ease. A sound must be most intense at the point of generation unless it is reinforced at some other part; and, therefore, when a change is detected in the normal character of a sound it should be followed with the stethoscope to its points of greatest intensity. It is true that we are again met by a source of fallacy in the different conducting powers of the parts intervening between the source of sound and the chest-surface; but this may be eliminated by resorting to the usual tests of the character of the conducting media. With a little care and a little tact,

therefore, we may satisfactorily bring these changes of pitch to which I have referred, into the position of *positive diagnostic signs of spasmodic or non-spasmodic narrowing* of the respiratory tubes.

These points are illustrated by the following cases:—

Case XIX.—*Emphysema due to narrowed bronchi from repeated catarrh; high-pitched expiratory sound.*

Efforts at inspiration urgent. Elevation of chest marked. Resonance tympanitic. Hardly any inspiration audible. Expiration feeble, *high-toned*, and sibilant. Heart's sounds feeble and distant. Cardiac region much encroached upon by resonance. Fingers not clubbed, but inclined to die. Vertigo after fit of coughing. Loses blood by rectum. Very weak. Lame from childhood.

The cough began eight winters ago with suffocative catarrhal attacks in the morning, and continued to recur throughout each winter, getting better in the summer. The cough set in on the commencement of damp weather in autumn, with cold in the nose and chest, oppression at the upper part of chest and in the nose, preceding shortly the cough. It was not until after five winters that the breath was observed to be short, being first noticed during the occurrence of a bad cold with pains in the chest. Since that time, viz., three years, the breath had always been short, though much worse in severe weather. His lameness was due to abscess after measles in infancy.

In this case the Emphysema is readily accounted for by bronchial obstruction. The very feeble inspiratory murmur, even on violent efforts at inspiration, showed the extent to which Emphysema had gone, preventing suction-power; and the high tone and sibilus of the still feeble expiration, showed how small the calibre of the tubes had become. At the time of examination, treatment had been

employed by which the cough was relieved; but there is no doubt that the absence of cough and bronchial irritation was only temporary.

Case LXXV.*—*Spasmodic high-pitched Inspiration; relieved by Stramonium.*

A. B., aged nine years.—Complains of violent cough since getting a severe wetting and cold last summer Nearly lost cough while in the country at the latter part of the summer, but became again much worse with first cold this winter. The cough comes on in fits.

His mother says he had a "convulsion" at sixteen months old, and has been a delicate boy ever since. She thinks his breath has been shorter than in other boys ever since. He has been very subject to sneezing and violent running colds in the head and chest all his life. He did not suffer from cough till last summer, and since then his breath has been very much worse, and his heart palpitates very readily on exertion. Mother asthmatic, and her mother was the same; one sister is inclined to coughs. Chest deformed since infancy; left side flattened, right prominent. Resonance of right fuller than of left, neither super-resonant. Inspiration and expiration of equal length, both rhonchal and of about equal pitch, except that *at the end of a deep inspiration* the pitch rises very considerably. Forced expiration is very rough and rhonchal, but not raised much in pitch. These sounds exist all over the chest, except in the lower lobes behind, where the sounds are nearly normal. Heart's sounds normal.

He was blistered, and took Sescarb.and Hydroch. of Ammonia, with Morph. and Ipecac. for a week. The fits of cough were then nearly well, but the breathing oppressed. On examination the *in*spiratory sound was found to be very high-pitched, the *ex*piratory rough but of lower pitch.

Stramonium was then ordered, experimentally, to be taken one day and omitted the next, and so on. On his next visit he reported that on the stramonium day his breath was relieved, and got worse again the day he was without it. It was then taken regularly, and on examination *no abnormal elevation of pitch in inspiratory sound remained,* and he could take deep inspirations without cough. Discharged well in six weeks.

Case LXXVI.*—*Spasmodic high-pitched Inspiration relieved by Stramonium.*

J. M., aged 44, baker. Ill twelve years. General elevation of chest. Shoulders rather rounded. No superresonance back or front—in front, rather deficient of the two. Inspiration very high-pitched. Expiration rather long. Heart's sounds feeble. Twelve years ago, first attacked quite suddenly with "tightness" of breath, while in apparent good health. A cough came on at the same time. Similar attacks have recurred about every three months ever since. The attacks, he thinks, are brought on either by "over-heating the blood," or by "inhaling foul smells." They get worse and worse. Habits temperate; has smoked twenty-four years, but when he has an attack he cannot smoke. Has been a baker thirty-two years, but did not suffer from his chest till the sudden attack twelve years ago. No hereditary disease in the family.

Ordered ipecac. and squill pills, and counter-irritation, without relief. Then ordered ext. of stramonium, ¼ gr. three times a day, and he reported that he had been "quite cured ever since he took it." On examination there was no short breath. No spasmodic attacks since taking stramonium. Expiration and inspiration nearly normal; expiration rather long and harsh, but *the inspiration no longer high-pitched.*

I have examined the descriptions of the inspiratory and expiratory sounds in a number of cases, taken with no special reference to this question of pitch—taken, in fact, before I had thought much about it and with other objects in view. In these cases, therefore, no mention of the pitch of the respiratory sounds would have been made unless it had been very marked, so that alterations in this respect may have been present many times without being noticed. Nevertheless, I find that in the cases of Emphysema and Bronchitis conjoined the expiratory sound was prolonged in 69 per cent., and that it was at the same time described as *raised in pitch* in 74 per cent. of the cases in which it was prolonged.

But since I have paid attention to this subject, I have been able to point out to medical friends and pupils at this hospital, in how very large a proportion of cases of Emphysema the expiratory sound is *raised in pitch;* and also how often it is so changed in cases of catarrh which have not yet had time to produce distension of the air-cells.

I have also been able to demonstrate that relief by stramonium, nitre-paper, datura tatula, and other means known to relax spasm of the air tubes, may be safely predicted when the *in*spiratory instead of the expiratory is the sound of which the pitch is principally raised.

Now, I must ask, in conclusion, what can explain this raised pitch of the expiratory sound in a case of Emphysema, unless it be narrowing of the calibre of the tubes through which the expiratory tide passes? It is not to be explained by the susceptibility of Emphysematous persons to spasm of the tubes; because, as I have already shown, in spasm it is the *in*spiratory not the expiratory sound which is principally affected.

It is contrary to all acoustic laws to suppose that the pitch would be raised by a current of air being driven through a *tube of normal calibre* by a force *defective* in power. In Emphysema there is this defect in power—there is loss of the power to drive the air out of the chest with rapidity. We find the air passing out slowly, and yet the pitch raised above that which is natural to it when there is no defect in the driving force and no increased length of time occupied in the transit. It can only be explained by the simple fact that the passage through which the air is driven is of diminished calibre.

I have now furnished you, as I promised to do, (p. 9) with some means of investigating the causes of Emphysema, which are not open to those objections which I pointed out as applying to post-mortem examinations. Whereas they are competent to forewarn us of an approaching enemy before it is too late to prevent a catastrophe; I wish to impress upon you the fact that, in cases of Emphysema in which other sufficient causes for its production cannot be found, you will almost always be able to discover by the means I have now explained the existence of narrowing of the respiratory passages.

But before turning from this part of the subject, I ought to call your attention to a small but interesting class of cases, which might, if we were not prepared for them, lead us to doubt the correctness of our views as to the causation of Emphysema. I confess that they puzzled me at first.

The sort of case I refer to is this:—You clearly diagnose Emphysema. You search carefully into the history and find no rational cause for the disease except obstructed tubes. You then examine the chest, confident that you will find signs of such obstruction; but you are disappointed—the expiratory sound is *soft and of low*

pitch. It is clear, therefore, acoustically, that one of two things must be the case—either the tubes are of normal size, or, being narrowed, there is a remarkable loss of the driving power by which the current of air is forced through the narrowed tubes. Either of these conditions may of course give the same result—viz., a soft, low-pitched expiratory sound; and, practically, either of these conditions may exist in a case of Emphysema produced by narrowed air passages. We may have, in the class of cases to which I am now referring, either of these two complications:—

1. Emphysema produced by narrowed air tubes—that narrowing still present and yet the expiratory sound soft and of low pitch.

2. Emphysema produced by narrowed air tubes—that narrowing no longer present, the expiratory sound soft and of low pitch.

The first of these complications occurs thus:—When thickened and narrowed tubes have produced Emphysema, that Emphysema may be still further and further increased by the obstruction to the outward tide, until the expiratory power is almost lost through excessive dilatation of the air-cells. The chest which, at a former period of the case—when expiratory power remained in sufficient force—would have driven the outward tide of air through the narrowed tubes at a *rate sufficient* to produce a sound of high pitch, has now so far lost its power, that, except under extraordinary stimulus, it cannot do more than urge on a current so slow and feeble that even in the narrowed tube it is incompetent to produce a sound of high pitch.

These cases can be cleared up and their nature made out, by attention to the following points:—1st, the

existence of excessive super-resonance; 2ndly, the *great length* of the soft, feeble, low-pitched expiratory sound; 3rdly and especially, by making the patient give the deepest inspiration he can, and then the sharpest, hardest, sudden expiration he is capable of, and the increased force and rapidity thus given to the expiratory tide discloses the secret of the narrowed tubes, by eliciting their high-pitched sounds.

The second of these complications occurs thus:—When thickened and narrowed air-passages have produced Emphysema, either by the long continuance of the narrowed condition, or by the co-existence of other circumstances during the time of their greatest loss of calibre, the Emphysema may remain as the only vestige of their narrowed state; altered conditions of life — such as change of climate, successful treatment, long freedom from catarrh, and the like—having, in course of time *restored the air passages to their normal calibre.*

This is one of those cases to which I referred when speaking of the unsatisfactory character of post-mortem evidence, if not kept within its proper limits. No post-mortem evidence would here be found to tell that the Emphysema had been produced by narrowed tubes; and as the case would be just one in which the walls of the Emphysematous air-cells would be likely to have become degenerated, it would be set down as a confirmatory case of the degeneration theory. The degeneration of the cell-walls—which had in truth taken place since their diseased distension had occurred — would be the only apparent cause, found after death, of that distension, and would most probably be set down as the true cause.

Now the clinical history of such a case, examined into carefully during life, would most likely show that there

had been a period, at some past date, when the patient suffered from those catarrhal affections of the naso-pulmonary tract, which were sufficient to produce the thickened tubes and hence the Emphysema.

The same clinical history would afford evidence of those altered conditions of life and of that altered condition of the patient, which had led to the removal of the naso-pulmonary affection. I say, confidently, that the history would afford this evidence in the majority of instances, because I have found, in a very large experience, that such has been the case when examples of this complication have come before me.

The following three cases illustrate the two sets of complications I have described :—

Case LXXVII*.—*High-pitched expiratory sound. Narrowed primary air passages. Emphysema beginning ; good vis a tergo.*

D. E., aged 64, dealer. Short breath in winter for several winters, but never so short as this year. Cough began before short breath ; has returned four or five winters. A loud high pitched wheeze, with expiration audible across the room, which, on auscultation is found to originate in the larynx. Chest not barrelled or prominent or much raised in breathing; abdomen not retracted. Front and back rather super-resonant in the upper half, and in these parts inspiratory sound is very short, expiratory sound very long, and of higher pitch than inspiratory. In the lower parts the inspiration is longer, and the expiration is lower-pitched than inspiration.

Case LXXVIII*.—*Extensive Emphysema. Narrowed tubes; vis a tergo diminished. Expiratory sound low-pitched till raised by forced sudden expiration.*

E. F., aged 44, coal dealer (formerly schoolmaster).

Cough five winters. Suffers from acid dyspepsia. Chest-elevation rather exaggerated, walls thin; resonance in excess all over chest, back and front. Inspiratory sound occasionally rhonchal; expiratory sound long, soft, and faint during normal quiet breathing, of about the same pitch as inspiration; but on forced expiration the duration is still long, but very *much raised in pitch.* These characteristics of inspiration and expiration are especially marked in the front and upper parts; in the back and lower parts expiration is coarse and not so high pitched. Heart's space almost completely covered by resonant lung; epigastric pulsation.

Breath began to be short five years ago, after a cold and cough; no other illness at the time; previous health good. The attack of cold and cough was long and severe; never quite free from cough since, but every winter it has been much aggravated. The breath has varied, sometimes being free and at others short—always very short when the cough gets worse. East wind, frosts, and fogs, are the things most inclined to make breath short. In winter the least exercise makes it short; not so in summer. Colds first fall upon the throat and chest. The things most inclined to give cold are perspiration; exposure to damp, change of clothing. Mother died healthy at eighty; father died at forty-two from Asthma brought on by a succession of colds. Conditions of life not unfavourable.

Case LXXIX*.—*Narrowing of Bronchi, producing great shortness of breath. High pitch of expiration removed by treatment. No Emphysema yet produced.*

C. R., age 55, married. Breath extremely short, cough severe and tearing. Says she had neither cough nor short breath till two years ago, when she was suddenly seized with pains in the chest and short breath, and had

a severe attack of Bronchitis, which laid her up many weeks. This was in the winter; as the summer came the cough went, and the breath became quite natural. She is sure the breath was not short while she was free from cough in the summer. Last November (nine months ago) she caught cold, and the cough and short breathing returned, and they have continued getting rather worse than better all through the spring and summer, and now the breath is distressingly short and cough very troublesome.

No super-resonance or undue prominence of chest; no dulness. Inspiration harsh and rhonchal; expiration higher-pitched than inspiration, and prolonged; heart's sounds feeble. She looks ill-kept.

Ordered three blisters in succession—one on each side of the chest, and one in front. Ipecac. and comp. squill pill. —She reports at the end of a fortnight that the breath is very much relieved by the blisters, each blister seeming to make it better than the one before.

Conium inhalation; ipecac. squill and quinine. At end of another fortnight, "wonderfully improved." Can now walk as she has not done for months. Harshness of breath sounds diminished, and expiratory sounds much lower in pitch since treatment.

In Case LXXVII* we find well marked signs of narrowed tubes, conjoined with Emphysema in an early stage; the expiratory force still good.

In Case LXXVIII* we find the signs of excessive Emphysema, with a long, soft, feeble expiratory sound of *low pitch;* but this pitch *raised,* so as to disclose the existence of narrowed tubes, when the forced sudden expiratory test is applied. We may, in fact, regard this case as the representation of what Case LXXVII* would become if it went on without amendment.

On the other hand, we find in Case LXXIX.* all the signs of narrowed tubes and impeded respiration, needing only time to develop Emphysema; but under the influence of active treatment the high-pitched expiratory sound, characteristic of narrowed tubes, disappeared, the normal pitch was restored and with this a restoration of free respiration. Had this case gone on, therefore, till Emphysema had been produced before the narrowed tubes were cured, as in Case LXXVII.*, we should have had, when the patient was discharged with normal tubes, exactly the complications I have described under the second heading (p. 67).

According to my promise in a former lecture (p.6), I have a few words to say, in passing, concerning the vital objections to the "degeneration," "collapse," and "inspiratory" theories of the production of Emphysema.

The degeneration theory originated, I believe, in a discovery made by Mr. Rainey. In a lung which he examined after death he found some portions Emphysematous, and although the lung tissue in the immediate neighbourhood of these portions was perfectly healthy, the walls of the Emphysematous air-cells had undergone degeneration. Upon the basis of this, and a few other subsequent observations of a very limited character, it has been assumed that a degeneration taking place in the walls of the air-cells constitutes the primary cause of Emphysema,—the loss of normal resiliency caused by the degeneration leading to the gradual distension of the cells under the pressure of respiration. This theory, as you will see, does not interfere with the question as to whether it is during inspiration or during expiration that the pressure of air on the interior of the cells is exerted; and, supposing such degeneration to take place, Em-

physema might easily be produced in the degenerated parts by the backward current of air during expiration. Therefore, there is no inconsistency in holding both the degeneration and the expiration theories.

The rather serious objection, however, to the degeneration theory is this, that there is no evidence at all that the required degeneration takes place, except as quite an occasional and exceptional occurrence. It is perfectly in accordance with the general pathology and clinical history of the degeneration of tissues to suppose that air-cells which have become over-distended, bloodless, and paralysed in function should, in course of time, become degenerated; and it is also very natural, though perfectly gratuitous, that a morbid anatomist, finding this change after death, should attribute the Emphysema to the degeneration instead of the degeneration to the Emphysema; because he has no possible means, on the dead subject, of determining the true order of succession in the morbid changes which he observes.

Treating of this theory Dr. Waters says: "But although microscopical examination does not enable us to detect any structural alteration in the ultimate tissues of the air-sacs, and the application of other means furnishes us with no proof of the presence in them of any morbid conditions, yet that degeneration *does not* exist is by no means determined by the failure of our present methods of investigation to demonstrate it." . . . He then goes on to say:—"I shall state briefly the circumstances which induce me to believe that Emphysema is the result of some degenerative process. . . . . .

"1. The high degree of development which the disease often reaches, without any previous history of violent and long-standing cough, either in connection with bronchitis, whooping-cough, or any similar affection.

"2. The frequency with which the disease attacks the whole of both lungs, and the uniformly equal character of the morbid changes often observed throughout all parts of the lungs.

"3. The hereditary nature of the disease, as shown by the observations I have alluded to (Dr. Jackson's).

"4. The manner in which the disease is influenced by certain remedial measures, which are known to act beneficially on other diseases attended with degeneration (Iron and Strychnia)."

With regard to the first and second of these propositions, it is evident that, if Emphysema may be due to the long list of causes which we have already discussed; and if the date of its production may in some cases be many years back, so that the history of the occurrences on which it depends may easily escape observation; while in other cases it may be due to causes acting gradually and quietly, of which Dr. Waters does not take account; and if affections of the primary air passages are to be included, as I have asserted, among the sufficient causes of Emphysema, we have no need to resort to an imaginary state of degeneration to account for all the difficulties which Dr. Waters sets forth in the first and second propositions.

In answer to the third proposition. If due to such causes as affections of the naso-pulmonary tract, dependent on diatheses the tendency to which is known to be hereditary, there is no need to resort to any other explanation of the asserted hereditary character of Emphysema. (See Tables of Hereditary Transmission, which show that the hereditary tendency is greater in Bronchitis than in Emphysema.)

In answer to the fourth.—Seeing that the remedies referred to by Dr. Waters as improving the condition of

Emphysematous patients are Strychnia and Iron, which are known to be beneficial in muscular debility and anæmia, all the benefit they have been found by Dr. Waters to confer on the sufferers from Emphysema may be easily attributed to improved blood and muscular tone in the patients, enabling them better to contend with a wearing and weakening disease.

The next theory I propose to mention is that originated by Dr. Gairdner, of Edinburgh (See *Edinburgh Monthly Journal*), an able and ingenious observer, whose suggestions are always worthy of careful consideration.

"It has been shown by the researches of Gairdner and others, that pulmonary collapse and Emphysema are frequently found existing together in the same lung, and the former author has so constantly seen the two affections associated together, that he has looked upon them as having the relation to each other of cause and effect. His opinions may be summed up as follows:—Adopting the view that Emphysema is produced by the force of the *inspired* air acting upon the walls of the air-sacs, he considers the disease in the light of a complementary lesion, depending upon the fact that a portion of the lung has become diminished in bulk, and incapable of distension. (Dr. Waters.)

In this assumed relation of collapse and Emphysema, as cause and effect, there are two obvious sources of fallacy:—

1. The occurrence in the same lung of the two states, when examined after death, is presumptive evidence of their being both dependent upon some common cause, rather than of one being the cause of the other.

2. In order to prove that Emphysema is only an effect of collapse of lung, every case of Emphysema ought to pre-

sent evidences of collapsed lung. Again even supposing a collapsed lobule of lung to be competent to lead to Emphysema, as assumed by Dr. Gairdner, it clearly could not be a sufficient cause for more extensive Emphysema than would represent, by increase of bulk, the loss of bulk due to collapse; and therefore would be an utterly insufficient explanation of a large number of the worst cases of lobar Emphysema.

I have suggested (p. 48) that probably the *inequality* of pressure upon the air-cells, caused by a portion of lung substance becoming suddenly diminished in bulk by collapse, may become a cause of local Emphysema in the adjoining vesicles when the expiratory act exerts its pressure on the lungs; that, in fact, the air which under ordinary circumstances would be forced onward in the outward tide, finds so little support from the walls of the cells adjoining the collapsed lobule that it distends them instead of passing outward.

But even supposing this operation to take place, there is no need to resort to the inspiratory theory to explain the Emphysema. It comes naturally under the operation of expiration. A cell the walls of which have lost their normal support will be virtually in the same position, with regard to its liability to distension, as one which has an obstruction placed in the way of the free escape of its contents under pressure and an undue force thereby exerted upon its inner wall.

But, although I am free to admit the possibility of Emphysema being so produced in the cells lying close to the collapsed part, I confess I am quite at a loss to see how portions of lung can become Emphysematous through the influence of collapse of other portions lying at a distance from them.

It is true that the Emphysematous patches have been seen lying side by side with the collapsed, but these are exceptional cases, and the contrary is the rule. Collapse of the lung is most frequent in its posterior and lower parts; Emphysema is most frequent at the apex, and along the margins of the lungs.

I think, then, as I suggested just now, that instead of taking for granted, that, because these two states—collapse and Emphysema—are often found to co-exist, although Emphysema often exists without collapse, therefore they are related as cause and effect; we should rather turn to see if there is not in these cases a third phenomenon, which stands in the relation of *common cause to the other two*. Such a phenomenon does indeed exist in these cases, although we miss it altogether in a post-mortem examination. This phenomenon is a convulsive straining cough. No case of collapse of lung is likely to take place without the occurrence at the time it happens of a fit or fits of straining convulsive cough, and the cases in which collapse is likely to occur are just those in which straining and convulsive cough is likely to be one of the features of the attack, whether collapse happen to take place or not. It is nothing but what we ought to expect, then, in accordance with what I have endeavoured to point out as the operation of the expiratory theory, that when we find portions of lung collapsed we should also find other portions Emphysematous.

Of the Inspiratory theory there is no need to say much, seeing that I have shown, as I think satisfactorily, that it is during expiration that the strain is put upon the air-cells. The inspiratory theory has been marshalled under the great name of Laennec as its champion, and I am inclined to think that but for this prestige it would never

have had many supporters. But it so happens that the best support which Laennec gave to this theory is of such a character that in truth it supports the expiratory theory instead of the inspiratory; if applied to the inspiratory it will not bear a moment's consideration.

Laennec is supposed to have believed that "Emphysema is occasioned by an over-distension of the air-cells, from accumulation of air taking place in them in consequence of the obstructed condition of the bronchial tubes, the air being forced through them by each inspiration and not evacuated by expiration, so that it accumulates."—(Dr. Waters, p. 39.)

You observe here that Laennec provides the essential conditions for dilatation by the expiratory theory, viz., obstructed tubes, and a freer inspiratory tide, and a more obstructed outward tide; but the supposition necessary to make inspiration the dilating cause is palpably absurd; for if, as stated, the air were forced into the cells by inspiration and not forced out of them by expiration, thus allowing it to accumulate, it is clear that the cells would be rapidly distended beyond measure, and rupture, with interlobular Emphysema, would occur as a necessity. Even supposing the accumulation to be ever so slight at each inspiration, when we consider the number of inspirations every hour, and the consequent accumulation which would take place, it is clear that no lungs could remain unruptured for twenty-four hours. But the whole thing is brought back within the bounds of common sense when we recollect that, instead of the air being allowed to accumulate, clinical examination of the disease teaches us that the expiration is prolonged in proportion to the obstructions of the tubes, and that all the auxiliary expiratory powers are brought into requisition, because it

cannot be permitted by the organism for one hour that the air admitted by inspiration should exceed its normal proportion to that discharged by expiration. And in this clinical fact we get the proof of the fallacy of the idea of accumulation, introduced to make it possible for the inspiratory act to cause Emphysema; and, at the same time, we find introduced the element necessary to produce Emphysema by expiration, viz., a backward pressure upon the interior of the cells.

I have now shown you that the expiratory theory, when understood as I have attempted to explain it, and when it is made to comprise all the causes of Emphysema which I have enumerated, has this among its other advantages, that it is competent to explain all the phenomena which have been brought as proofs of the correctness of other theories. (See note, p. 4.)

Now, I fear you may think that I have spent an unnecessary amount of time in discussing the question, whether Emphysema is produced by the inspiratory or by the expiratory act, and I must hasten to show you why I place so much importance on this question, and have thought it worthy of so much consideration in relation to Winter Cough. It is because the views we entertain upon this point lie at the very root of all our practice, when we come to deal with Winter Cough. It is therefore of the greatest practical importance.

I have the more satisfaction in holding the view I have been trying to inculcate, becanse it is the one which gives us the most hope in the *treatment* of Winter Cough; which stimulates us to the most careful and far-sighted plans in the management of Winter Cough; and enables us to give our patients the most cheerful encouragement under their sufferings. And lastly, but by no means

least, it is a view which dictates a *preventive* policy; which leads us to understand when we are dealing with germs which, if *un-nipped*, may develop into disastrous diseases and leave behind the most serious vestiges, and when we are dealing with these vestiges, which may be increased in extent and severity if we do not remove every trace of the germs from which the original diseases sprang. (See Lectures VI., VII., VIII. and Table XXIII.)

LECTURE IV.

Catarrh and Bronchitis without Emphysema.—Reasons for the absence of Emphysema.—Illustrative Cases.—Exceptional Cases of Winter Cough.—Disease of the Heart.—Coughs and Colds.—Tables III., IV., V., VI.—Part of the mucous membrane most susceptible in different Cases.—Tables VII., VIII.

I HAVE now to direct your attention to that large class of cases of Winter Cough in which no Emphysema has yet been produced :—the cases which I have placed in the third or Red Group of our clinical arrangement. In these we find evidences, in the history, physical signs and general symptoms, of inflammation, congestion and irritation of the naso-pulmonary mucous membrane, more or less permanent and chronic and especially apt to be recurrent and to produce Winter Cough. It is only necessary to examine with care the abstracts of these cases to discover the reasons why Emphysema had not resulted from the catarrhal affections.

ABSTRACTS OF CASES.

Case III.—The bronchial affection was only of one year's date. There was evident bronchial obstruction, but no severe stress had yet been put upon the breathing ; and, therefore, longer time was required to develop Emphysema.

Case X.—At the age of fifty, no considerable obstruction of the bronchi had become permanent, although the patient had been subject to cough from a boy ; so much had he escaped, that the breath had only begun to be short three years ago, commencing during an attack of pleuritic pain ; and, at the time of admission, his respiration was "free."

Case XII.—Spasmodic contraction of the bronchi occurred directly catarrh reached them; and this was always quickly relieved by free exudation from the mucous membrane, which at the same time removed tumidity of the membrane. Thus there was no considerable obstruction to the outward tide.

Case XIII.—The short breath was caused, in the first place, nineteen years ago, by dilated heart—the cough not occurring at all till seven years after, when the heart disease had gradually produced pulmonary congestion. The patient had led an inactive life principally occupied with her needle, prevented by the heart affection from taking exertion, so that no great stress had been put upon the respiratory organs. The cough had not been severe as a general rule; and on taking fresh cold she got free exudation, and thus the bronchial membrane was easily relieved. The severe symptoms, indicating serious bronchial obstruction, with which she was admitted to hospital, were quite recent. These circumstances explain the absence of Emphysema. Supposing the bronchial obstruction from which she was suffering on admission to continue and Emphysema to result, there can be no doubt that this case, seen some years later, would be taken in the ordinary course as one of Emphysema with intercurrent Bronchitis, and consequent dilatation of the heart. The peculiar family history —which shows that the mother, father, one brother, and three sisters had suffered from "asthma"—would be taken as striking evidence of the hereditary character of Emphysema. Had Emphysema existed, a fallacy might easily have arisen from the fact that short breath dated from a severe confinement, in which a tumour in the uterus interfered with natural labour. It might plausibly have been argued that Emphysema was produced by forcible expiratory efforts at that time. All of these versions

are negatived by a cautious enquiry into the past history of the case; and it well illustrates the importance of taking such care as I have already advised before forming our judgments.

Case XVI. is very remarkable—no Emphysema existing after a cough of twenty years' duration. No interference with breathing occurred till seven years ago, and then it was probably due to exhaustion from Dysentery, coupled with a thin-walled heart. The breath had only been short at intervals since that time, when suffering from colds. We are almost obliged to look at the physical signs in this case to explain the history. We find there that the *expiratory sound was normal*—the principal morbid sounds accompanying the *in*spiration, which was harsh and accompanied by ronchus and high-toned sibilus in various parts; and in conjunction with these, it may be noted that the cough had been nearly dry, and almost confined to the paroxysms in the morning. Its character, therefore, was probably due to spasm of the bronchi—the interference being to the inward, not to the outward, tide.

Case XVIII.—A Winter Cough of ten years had not produced any serious amount of bronchial obstruction. There had been complete freedom during the summer months; and, probably, this accounted for the absence of permanent thickening of the mucous membrane.

Case XXI.—Attacks of simple bronchial catarrh, not very severe in degree and speedily yielding to treatment (at least, it was so with the attack for which she was admitted), had recurred for eight winters, and quite disappeared in summer. No Emphysema had resulted at the time of admission, but the physical signs showed that the smaller bronchi were beginning to diminish in calibre. It might be expected, therefore, that if this went on,

Emphysema would sooner or later result; but at present there was not sufficient obstruction to the outward tide to produce it.

Case XXV.—The cough had existed throughout the greater part of life, but had only been severe during two years; and during that time the attacks had been characterised by bronchial spasm excited by contact of cold air; so that, at the age of fifty-three, no considerable change had taken place in the bronchial membrane, and the outward tide was not seriously obstructed.

Case XXIX. was a delicate boy of seventeen, who was becoming subject to attacks of Bronchitis through exposure to vicissitudes of temperature. They were frequent, but evanescent. No bronchial obstruction had yet been produced and no Emphysema. He was easily relieved by treatment; and, by changing his occupation, ceased to suffer from his bronchial attacks.

Case XXXII.—The cough had existed in winter during seven years, but there had been complete freedom from it during summer. The breath became short very soon after the cough first occurred and came on during an attack of Dyspepsia. Both short breath and cough were excited by cold but were of the spasmodic character; and the absence of Emphysema is accounted for by the inward current being more affected than the outward, and by the complete freedom from cough and Dyspnœa during summer.

Case XXXVI.—As there were no signs of interference with free respiration anywhere, except in a very circumscribed spot, and no history of any attack of disease of a more severe character than the present one, there was no reason for Emphysema to have been produced, although the cough was of twelve years' duration.

Case XXXVII.—The essential character of the respira-

tion was, impediment to the *in*ward current from bronchial spasm. There was also a slight amount of tumidity of the bronchial membrane, but not sufficient to present any considerable obstruction to expiration.

Case XXXIX.—This again was a case of evanescent spasmodic obstruction to inspiration, leading by repeated attacks to more and more irritability of the bronchial membrane. Although of fifteen years' standing, no Emphysema had resulted—the obstruction to the outward current being slight.

Case XLIII.—No obstruction was presented to the outward current—the inspiratory sound being alone affected. Although the cough had returned for fifteen winters, no Emphysema had resulted. The long and harsh inspiratory sound was due to bronchial spasm superadded only two years ago.

Case XLV.—Although the man was accustomed to lifting weights and other active exertions, and had suffered from cough as long as he, at 54 years of age, could remember, no Emphysema had resulted; and the explanation is found in the fact that the expiratory power was free.

Case XLIX.—At the time of examination the obstruction to the outward tide was considerable, and such as should, if continued, exert a dilating influence on the cells; but the resonance was normal and the heart's space not encroached upon. The breath had been short since early childhood during good health, and had remained so ever since, yet there was no Emphysema to account for this. The heart-sounds were feeble and the pulse the same, though the patient looked hearty and well. The feeble heart seems to be the only explanation for the long-continued short breath before the occurrence of cough. No cough occurred till seven years ago, when she was

seventeen years old and then only came with ordinary symptoms of cold, not apparently in any relation to the old-standing short breath. It had only existed in winter, till twelve months before admission; during that twelve months it had been continuous. I am led to conclude that the physical signs present on examination were of recent origin,—the obstruction to expiration not having existed long enough to produce dilatation of the air-cells, this change probably taking place less readily in consequence of the good health of the patient.

Case LIV.—Had all the conditions necessary for the gradual production of Emphysema, but none of them had existed more than four years, the severe symptoms much less than this, therefore, time had not yet served to develop dilatation of the cells.

Case LX.—Was only seen during the existence of catarrh, the expiration was long and rough at that time, the inspiration dry and harsh. There had been no short breath till six months before admission, and then only during fresh attacks of catarrh. It is fair to assume, therefore, that the bronchial obstruction was not a permanent condition and hence that, although the patient had been subject to cough for twelve years, the freedom from Emphysema is explained by the want of sufficient and permanent bronchial obstruction to produce it. The cough had always occurred with cold and disappeared when free from cold, so that the mucous membrane had had time to recover in the interim. Doubtless the repetition of such attacks over a long period of years, if neglected, would in time produce sufficient bronchial obstruction to lead to Emphysema.

From a careful examination of these cases, it is seen that the reasons why Emphysema had not occurred were, either, that there was not sufficient obstruction to the out-

ward tide, or that the obstruction which existed had been of only short duration, and time was yet wanting to develop the Emphysematous condition. Many of them are in fact only incipient cases of Emphysema; while others teach us the important practical lesson, that so long as we can maintain a free expiratory power during chronic Bronchitis, or when we can so cut short attacks of bronchial affection as to restore the normal freedom of the outward tide in a very short time, we may avoid and prevent the occurrence of Emphysema. (See Lectures VII., VIII., IX.)

Group V.—Exceptional Cases.

Although the great majority of Winter Coughs are either cases of Bronchitis, or of Bronchitis and Emphysema conjoined, there is a certain number which do not belong to either of these classes, and require to be carefully distinguished in practice.

I exclude from detailed consideration all cases in which the cough is dependent upon Tubercle in the lungs, as beyond the objects of these Lectures. (See Lect. IX. and my works on Tuberculosis and Consumption.)

It is, however, important to bear in mind that a slight cough coming on with the winter for a second or third time, and nearly disappearing in the summer, may be a sign of the presence of Tubercle in the lungs; and thus "Winter Cough" may be a passing phase in the history of consumption.

It must also be remembered that, as all cases of consumption are accompanied by cough, and as the cough is very apt to be convulsive, they only need the ordinary conjunction of obstructed expiratory tide to become complicated with Emphysema. Emphysema is in fact a frequent accompaniment of Tubercle in the lungs.

Excluding consumption, then, and without attempting to exhaust the subject, the following headings will be found to include the principal exceptional cases of Winter Cough arranged in the order of their importance:

1. Post-nasal catarrh.
2. Chronic recurrent laryngeal and tracheal catarrh.
3. Ear-cough.
4. Follicular disease of the pharynx.
5. Superficial inflammation and serration of the edges of the soft palate.
6. Elongated uvula becoming relaxed and œdematous with every fresh attack of cold.

These may each exist separately, but they are often found associated in a single case.

Laryngoscopy.

The use of the laryngoscope having now become almost as familiar as that of the stethoscope, it might be expected that exceptional cases of Winter Cough would have received considerable elucidation by its means. This is the case, however, to a very limited extent. I have been accustomed to examine all such cases with the laryngoscope, but I find that Laryngeal and Tracheal Catarrh are as easily diagnosed by the stethoscope as by a laryngoscopic examination, and with far less annoyance to the patient; and after eliminating Post-nasal Catarrh, these constitute the large majority of exceptional cases of Winter Cough. Ear Cough, follicular disease of the pharynx, and affections of the uvula and soft palate, do not of course require a laryngoscope for their demonstration. It remains, therefore, for this instrument to find its use in cases of Winter Cough, almost solely for the discrimination of morbid growths within the larynx, when these

happen to be combined with sufficient bronchial or lung disease to complicate the diagnosis by auscultation and percussion.

Post-Nasal Catarrh.[1]

The most important of these exceptional cases, in relation to Winter Cough, is Post-nasal Catarrh. It is surprising how often chronic and intractable cough may be found to be due to this simple cause ; it is one, therefore, that should never be forgotten when investigating a new case.

The attention of the profession was first specially called to this complaint in a paper which I read before the Abernethian Society of St. Bartholomew's Hospital, in 1854. Subsequent experience of a very large number of cases has fully confirmed the accuracy of the account of the disease which I then drew up, and I therefore give the following extracts from my original paper, with the addition of some matter suggested by more extended observation :—

" Among the diseases which come before the physician, rather as sources of discomfort than as causes of death, the one I am about to describe, and which I have named *Post-nasal Catarrh*, is particularly worthy of attention :— 1st, from its frequency ; 2nd, from the great inconvenience it occasions ; 3rd, from the serious effects of which it is occasionally the indirect cause ; 4th, from its being accompanied by the symptoms of other diseases, and thus misleading the patient, if not the medical man ; 5th, from the obstinacy with which it often resists treatment."

" Notwithstanding the obvious existence of Post-nasal Catarrh as a common complaint, it has not, so far as I can

[1] For treatment see Index and Lect. VIII.

learn, ever been described as a distinct affection. I have, therefore, ventured to fill this gap by a brief description of the disease."

Post-nasal Catarrh may be acute or chronic, but it is much the more frequent in the chronic form, and is rather to be classed among the "vestiges" of disease than among primary affections.

The acute form is caused, as a general rule, by recent catarrh super-added to the chronic disease, the latter being the characteristic affection. I have, therefore, selected the chronic form for description. The symptoms are as follows :—

1. A sense of fulness deeply seated in the back of the nose, with a stinging and tingling sensation about the uvula, soft palate, and posterior part of the hard palate. This sensation is much aggravated after sleep, so that the patient *wakes every morning with a sore throat;* but on examination of the throat, no inflammation, ulceration, or swelling is detected.

2. Short tickling cough coming on at intervals, especially night and morning or if long without food or drink ; but on examination of the cehst no morbid sounds are present.

3. Frequent hawking and spitting of small pellets of mucus, some of which are not unfrequently of an orange-brown colour and very tenacious, and sometimes mixed with clots of blood.

4. On examining the pharynx, shreds of stringy mucus may often be seen hanging down from behind the velum ; or the back of the pharynx is coated with grey, or brownish, or green adhesive mucus, and sometimes, but not always, the mucus follicles are enlarged and red. In some old-standing cases the green mucus dries like a scab on the

back of the pharynx, and in the worst cases the breath is insufferably offensive.

5. The morning sore throat is not relieved until, after much forcible blowing of the nose, which is usually dry, a few pellets of inspissated mucus are removed. This mucus is often orange-brown from the admixture of a very small quantity of blood. The excretion of these pellets, which is a very troublesome process, gives immediate relief; very often distressing retching is produced by the presence of the mucus between the posterior nares and the pharynx, too low to be affected by nose blowing, and in these cases warm drinks and swallowing mouthfuls of bread assist in giving relief. But a certain amount of stinging and tingling soon returns, and is especially teasing when any mucus collects on the back of the uvula.[1] This continues through the day, to be aggravated as before by the succeeding night's rest.

6. In order to relieve the uneasiness about the fauces and posterior nares, the patient is constantly annoyed by an almost irresistible desire, either to draw the mucus down the throat, by a forcible inspiration, or to force it into the nose by an opposite effort; and, therefore, those who suffer from Post-nasal Catarrh acquire a habit of making a peculiar noise in the nose and throat, which is *pathognomonic of the complaint in its chronic stage*. It is produced by inspiring by the mouth, closing the glottis, and then, with the tongue pressed against the hard palate, suddenly opening the glottis and jerking a gust of air up the pharynx through the posterior nares into the nose. This gives temporary relief. Considerable comfort is also obtained by swallowing food.

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[1] See Appendix iv.

7. The usual symptoms of Coryza—watery discharge from the nose, nasal voice, feverishness—are absent. If by any cause these symptoms are produced, those of Post-nasal Catarrh are for the time somewhat relieved, but only to be aggravated afterwards.

The history of the case will generally show that the post-nasal affection has been left behind as a vestige of one or more severe attacks of Influenza, Coryza, or Quinsey, or of many slighter Catarrhs coming in quick succession. In many cases I have found the disease traceable to a long past attack of one of the acute specific diseases, especially small-pox, measles, or scarlet fever; and children who have suffered from Syphilitic snuffles in early infancy are very apt to be the subjects of Post-nasal Catarrh as they grow up.

Although the mucous membrane of the posterior nares and fauces is usually implicated, the special seat of this affection appears to be in the sphenoidal and posterior ethmoidal cells. The following considerations lead to this opinion:—

1. The deep seat of the sensation of fulness.

2. The absence of nasal voice, and of interference with nasal respiration, except when the secretion has been voluntarily forced into the nose, or when ordinary Catarrh is superadded.

3. The great difficulty in dislodging the secretion and of bringing it within the range of a sneeze.

4. The slight interference with the sense of smell, and the tendency of the secretion to accumulate and inspissate during the time the patient is in the recumbent posture.

5. The tendency of the secretion to flow down by the

posterior nares, rather than by the anterior ; which corresponds with the direction of the superior meatus, into which the sphenoidal and posterior ethmoidal cells discharge themselves.

6. The stinging and tickling of the uvula, and hard and soft palates, unaccompanied by any constant morbid appearances in them ; which corresponds in position with the distribution of the spheno-palatine branches of the superior maxillary nerve, and may thus be accounted for as the transferred impression of irritation in the sphenoidal cells.

7. It seldom develops all its characteristic symptoms before the period of puberty, which corresponds with the development of the sphenoidal cells.

The relief to the cough by taking food or drink is simply due to the removal, by these means, of the mucus clinging to the back of the fauces.

The duration of the complaint, when once established, appears to be quite indefinite, unless removed by treatment, and its tendency is to get gradually worse.

Among the serious effects of which this affection is sometimes the indirect cause, may be mentioned the production of hernia, the rupture of blood-vessels, strains to the lungs, Emphysema, and injuries to the internal ear, from violent nose-blowing.

True Post-nasal Catarrh must be distinguished from the simple post-nasal discharges, so common with children, which are of quite a different nature. They appear to be simply due to the difficulty which children have in effectually blowing their noses ; hence the nasal secretions, when augmented by cold, escape by the posterior as well as by the anterior nares and during sleep almost entirely

by the former. This discharge into the fauces, as in true Post-nasal Catarrh, gives rise to troublesome cough which, through neglect of auscultation, I have often seen mistaken for Bronchitis, and much time and treatment wasted under this impression.[1]

Ear Cough.

My friend, Dr. Cornelius B. Fox has kindly furnished me with an abstract of a valuable paper,[2] in which he first called the attention of the Profession to this variety of cough. From my own experience I can confirm his observations.

For example :—A distinguished architect consulted me, December, 1870, in so serious a state of exhaustion and emaciation that he was on the point of relinquishing his profession. He had a frequent irritating cough, and could not take food without agonising pain. The cough and emaciation might easily have led to the conclusion that he was in a consumption, and such was the opinion of his friends and of himself. On examining the chest I found no disease of the lungs whatever, and close investigation of his symptoms showed that the wasting was due to want of food, the pain after taking food being so severe that he abstained from eating rather than incur the suffering. Pancreatic Emulsion, two teaspoonfuls one hour after breakfast and dinner, acted like a charm upon his apepsia, enabling him to feed without pain almost at once; and he came to me shortly after his first visit saying

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[1] A considerable number of cases of supposed "consumption" are brought to me every year, which, on careful examination, turn out to be nothing more than chronic post-nasal catarrh, with sanguinolent sputa.

[2] Read in the Physiological Section at the Annual Meeting of the British Medical Association at Leeds, July, 1869.

that he had no pain and would be quite well but for his cough, which did not get a bit better. Upon this I again made a careful examination, and found his chest, larynx, and throat quite healthy; but I discovered that one ear was a little deaf, and had a slight chronic discharge from it; and on introducing the ear speculum to examine the drum, a fit of coughing was at once excited, and the patient cried, "Oh! you must not do that; I never can touch that ear without setting up the cough." And such was the truth. I found that every time the ear was touched the cough came on. The external meatus was inflamed and irritable quite down to the margin of the tympanum. I ordered blisters behind the ear, sedative lotions into the meatus, and the orifice to be kept softly blocked up with cotton wool. The cough entirely disappeared, and with the continuance of the pancreatic emulsion after food, for some weeks, the patient completely regained health and flesh, and two years afterwards was actively pursuing his profession and enjoying his life.

Abstract of Dr. Fox's Paper on Ear-Cough.—Cough is most commonly symptomatic of diseases of the lungs and their coverings, of the trachea, bronchi, larynx, and fauces. Books tell us that it is occasioned by affections of the tonsils, uvula, pharynx, and neck. Organic diseases of the thoracic viscera, diseases of the œsophagus, spine and spinal cord, affections of the heart, liver and stomach, all have occasionally a cough as one of their symptoms. The irritation produced by teething, by enlargement of the bronchial glands, by worms in the intestines, by tumours, aneurisms, tubercles in the lungs, will produce cough. The inhalation of the dust of ipecacuanha, and of certain animal and vegetable emanations, will sometimes induce cough. Then there are whooping cough, asthma, nervous

or hysterical cough, and the cough occasioned by the presence of foreign substances, either solid, liquid, or gaseous in the air-passages. Uterine derangements, irregular gout, and an accumulation of bile in the hepatic ducts or gall-bladder, are all included amongst the causes of cough.

Lastly, there is a cough caused by irritation of the auditory canal—and that only in some people— to which I have given the name of *ear-cough*. I should not have presumed to name it, were I not pretty sure that this kind of cough has hitherto escaped description, and even recognition in our text-books. And this fact is the more singular, inasmuch as the sympathy between the auditory canal and the larynx was well known to the older writers, although apparently lost sight of by modern authors. This kind of cough has, doubtless, been confounded, up to a very recent period, with nervous cough, which occurs in persons of highly nervous temperament, and is due to a convulsive action of the throat muscles; or else it has been included in that *terra incognita* of idiopathic coughs.

One of the problems of Cassius Medicus was the following:—"Why does irritating the ears, as, for example, with a speculum, cause sometimes a cough, just as if the trachea were irritated?" Whytt, in his work on the *Sympathy of the Nerves*, published in 1767, refers to it, and states that, when the trachea has been rendered more sensitive than usual by a catarrh, cough is more readily produced by irritation of the auditory canal. Pechlin (*Observationes Medicæ*, Lib. ii., No. 45) affirms that "an irritation of the meatus auditorius will often excite coughing and sometimes vomiting." Coming down to more recent times, we find that Kramer, in his treatise on the

Diseases of the Ear, published in 1837, makes the following solitary observation relative to this subject: "Tickling and scratching the meatus excite in the larynx a troublesome inclination to cough." Romberg states that "Pruritus of the external meatus auditorius, from hyperæsthesia of the auricular branch of the vagus, is sometimes observed and is accompanied with cough and vomiting." The only references to this sympathy, with which I am acquainted, in recent works on medicine, are the following. Dr. C. J. B. Williams, in his *Principles of Medicine*, whilst enumerating the reflected and sympathetic sensations, writes: "Touching the external auditory meatus causes a tickling sensation of the epiglottis." Toynbee, in his work on *Diseases of the Ear*, says: "In certain cases the presence of a foreign body in the meatus gives rise to coughing, and even to vomiting; symptoms which seem traceable to irritation of the auricular branch of the vagus nerve." Yearsley refers in general terms to the alterations of the voice, as regards its pitch and quality, which occur in cases of deafness dependent on diseases of the ear, but does not otherwise allude to this connection.

In my graduation thesis, "Concerning the Laryngoscope and some Laryngeal Diseases" (June, 1864), presented to the University of Edinburgh, reference was made to the sympathy subsisting between the external ear and the larynx; and an explanation of the same was advanced. In a paper written by me in 1868, entitled "The Sympathy between the Auditory Canal and the Larynx," the occasional occurrence of ear-cough was adverted to. The advisability of a careful examination of the auditory canal was also urged in all cases where no affection of the respiratory tract can be discovered, and in which an obstinate cough, whether laryngeal in character

or otherwise, obtrudes itself as a prominent symptom. Further observation in this country and on the Continent has convinced me that a state of hyperæsthesia of the nerve supplying the external auditory meatus is not of unfrequent occurrence, and that a cough, solely dependent on the existence of some irritation in that canal, is by no means rare.

With the object of ascertaining the percentage of those subject to this sympathetic peculiarity, 108 persons have been examined by myself, and others under my direction, with the following results:—Males examined, 37; females examined, 45; sex not noticed, 26; total, 108. Cases in which a sensation of tickling in the throat, and cough, were occasioned by a titillation of the auditory canal, 22; cases in which nausea was *alone* produced, 3. In one of the cases of irritation of the throat with cough nausea was also complained of; and in another of that number vomiting was said to be sometimes produced. It is my impression that both ears display this extreme susceptibility to impressions more frequently than one ear only. In twelve cases, the ear was noted by the titillation of which these symptoms could be excited. Of these, in seven cases the left ear alone, and in the remaining five both ears exhibited this peculiarity. I have hitherto only seen one case where the right ear was solely affected with this hyperæsthetic condition.

Dr. Denton, who has kindly assisted me by the examination of many dispensary patients, was somewhat astonished to find that, in one woman, about twenty-four years of age, whom he examined, vertigo was alone complained of.[1] In another woman, about thirty years

[1] Dr. Brown-Séquard, in his *Physiology of the Nervous System*, refers briefly to the production of vertigo by an irritation of the neighbouring auditory nerve

of age, a sensation of tickling in the throat, cough and nausea, were produced by him on irritating the left ear; whilst vertigo was only experienced when the right ear was experimented on. He informs me that in neither of these cases was there any hysteria or fanciful nervous condition. He believes, moreover, that the statements of these women are thoroughly reliable.

The curious hyperæsthetic condition which we have been considering would seem, then, to be present in about twenty per cent. of those examined. I have not yet sufficient data on which to form an opinion as to its relative frequency in the sexes.

The response to the inquiry, as to the duration of the peculiarity, was generally to the effect that they had been aware of a feeling of irritation in the throat, usually followed by a cough on employing the ear-pick, so long as they could remember.

It is possible that this state of hyperæsthesia may be present more frequently than the foregoing percentage indicates, because those submitted to examination were nearly all workhouse and dispensary patients. In these people, the nervous organisation is not, of course, so sensitive as in the higher and better bred classes of society, and their powers of observation are more limited. I speak of those whose attention is rarely directed to any sensation short of pain, or of that which prevents the employment of the limbs and the ability to work.

Here are some short notes of a case of this hyperæsthetic condition of the nerve supplying the auditory canal, which differs from the majority of these cases, in possessing the peculiarity on one side only.

Case I.—A. B., a professional man, of middle age and nervous temperament, healthy, but somewhat overworked

mentally, has been annoyed, so long as he can remember, with a feeling of irritation in the larynx whenever he has introduced an ear-pick for a short distance within his *left* auditory canal. This sensation frequently excites a violent cough, of a suffocating or convulsive character. The organs of hearing appear, on examination, to be perfectly healthy, the sense being somewhat more acute on the affected side than on the other. A careful examination of his larynx by means of the laryngoscope, has assured me of the absence of any abnormality whatever. He often finds that the excessive use of his voice, as in long-continued singing, produces a pain in the ear, which extends into the zygomatic fossa and along the lower jaw towards the chin.

Irritation of the auditory canal in those who are the subjects of this hyperæsthetic peculiarity, does not *always* produce a cough. The situation of the irritation and its intensity have much to do in the production of this symptom. I know a medical man who is now troubled with a chronic inflammation of the dermis lining the meatus, accompanied by desquamation of the epidermis. This affection being limited to the *outer part* of the auditory canal, being mild in character, and free from symptoms of any severity, produces simply a sensation of tickling in the throat.

I will now give brief abstracts of two or three of the cases of ear-cough which have come under my notice.

Case II.—M. H., a healthy-looking married woman, aged 50, of sanguineous temperament, applied on account of a cough, in the endeavour to remove which she had spent much and profited nothing. She had suffered from it for eighteen months, during which period it had varied in force and frequency. At the time of her application, the cough seemed to be becoming worse. Her voice was un-

altered. The cough was laryngeal in character and most distressing. Failing to discover any cause for it on carefully examining the lungs and other viscera, I illuminated her larynx by means of a Tobold's condenser, and obtained a good view of the vocal organ by the aid of the laryngeal mirror. Nothing abnormal could be detected, if a slight exaggeration of the usual rose tint of the parts be excepted. Observing that she was somewhat deaf, I made some inquiries respecting her ears. She informed me that her right ear had given her some annoyance for nearly two years. The symptoms of which she complained were those of an accumulation of cerumen. She had, from childhood, noticed that, on cleansing her ears, a feeling of irritation in the throat and a cough were often excited. On making an examination of the auditory canal, a large plug of hardened wax was found, and removed by means of injections. The appearance of a small quantity of purulent discharge led to the discovery of a small oval ulcer on the floor of the canal, about one-eighth of an inch from the tympanic membrane. After two or three applications of a solution of nitrate of silver to the spot of ulceration, cicatrisation was complete, and in a few days, she was not only entirely free of the aural affection,but of the troublesome cough it had occasioned.

Case III.—N.W., a young lady of nervous temperament, aged about 22, of somewhat anæmic aspect, consulted me respecting her ears, as she suffered from deafness. Without entering into the history of the affection, which came on as a sequel to scarlet fever, it will be sufficient for me to state that the Eustachian tubes were the seat of chronic inflammatory action leading to obstruction. She had been deaf for two or three years, and had apparently exhausted the resources of orthodox medicine in the part of the country where she resided. Under these circumstances, her parents, with some con-

siderable hesitation, allowed her to consult an advertising quack. This man ordered her to employ some drops, which appeared to be composed of spirit of cajeput oil, or some other spirituous irritant. The result of this application to the auditory canal was the production of a great amount of irritation, closely resembling eczema. This irritation, which seemed most intense along the floor of the canal, was accompanied by a cough. I need hardly say that, as soon as the young lady came under my care, these pernicious drops were thrown away, and my sole endeavour was to repair the mischief occasioned by them. The cough could not be accounted for by any visceral affection, and was ascribed by me to the irritation of the nerve supplying the auditory canal, in one who was the subject of the peculiarity already adverted to. In about three weeks, the eczematous condition of the external auditory meatus had disappeared, and the accuracy of my diagnosis was established by the subsidence, *pari passu*, of the cough.

Case IV.—Toynbee, in his *Diseases of the Ear*, refers to a patient under his care, who suffered from a most intractable cough. He had a portion of dead bone in his auditory canal, which was removed. The withdrawal of this source of irritation was attended with an immediate disappearance of the cough, which no remedies had been able to subdue.

Before entering on the consideration of the mode in which ear-cough is produced, it will be necessary to make a few remarks with reference to the nervous supply of the auditory canal. It would seem that there have been erroneous ideas prevalent as to the source whence its nerves are derived. Romberg, whose opinion is endorsed by the late Mr. Toynbee, states, that the auricular branch of the vagus nerve is distributed to the external

auditory meatus, and that this nerve is concerned in the production of a cough when that tube is irritated.

Now, the best anatomists inform us, and their views have been confirmed by my own dissections:

1. That the auditory canal is supplied with nerves from the auriculo-temporal branch of the inferior maxillary division of the fifth cranial nerve. They are two in number, and enter the interior of the meatus between the osseous and cartilaginous parts.

2. That the auricular branch of the vagus is one of the several nerves which find their way to the external ear, this particular nerve being distributed to the posterior part of the pinna.

The other cranial nerve which takes part in the production of the sympathetic phenomenon that we are considering, is of course the vagus, which alone supplies the larynx by means of its superior and inferior laryngeal branches. It is well known that an impression at the peripheral extremity of a sensitive nerve may produce such a change in that part of the nervous centre from which it arises, as to excite a motor or sensitive nerve implanted near to it; and that, if a sensitive nerve be stimulated at its origin, a sensation is produced which is referred to its peripheral extremity. As examples of reflected sensations, may be instanced: *a.* The otalgia which often accompanies a toothache, and which is relieved by the introduction into the auditory canal of a little laudanum or chloroform; *b.* The pain over the brow sometimes induced by the swallowing of ice or cold water, or by a derangement of stomach digestion.

If the sensation which is reflected be powerful, a reflex action is sometimes excited in consequence of the irritation induced. The feeling of irritation in the larynx, as

a result of the titillation of the nerve distributed to the auditory canal, which feeling of tickling often provokes a cough, supplies us with an example. The impression produced in the ear in those amongst whom this sympathy between the ear and the larynx is exhibited, is probably conveyed by the auriculo-temporal branch of the inferior maxillary division of the fifth cranial nerve to the deep origin of its sensitive root, which is in close proximity to the deep origin of the vagus in the floor of the fourth ventricle. Here, a change is in all probability effected, which results in the stimulation of certain of the sensitive fibres of the vagus nerve. A sensation is produced by this stimulation, which is referred to the peripheral extremity of the superior laryngeal or sensitive nerve of the larynx. If an oft-repeated or powerful sensation is reflected, the irritation induced excites the reflex action of coughing, to free the larynx of the *supposed* irritation.

The cough arising from an irritation of the dental branches of the fifth nerve, which may occur at any age, but is generally seen in children who are teething, is occasioned in a precisely similar manner.

In conclusion, my observations may be thus summed up.

1. From amongst the unknown group of idiopathic coughs, may happily be rescued from obscurity a cough which is excited by an irritation of the meatus auditorius externus in certain individuals.

2. The persons referred to are those who possess a hyperæsthetic condition of the nerve supplying that canal, and in whom any slight titillation of this nerve induces a feeling of tickling in the throat.

3. This hyperæsthetic state generally exists in both ears, sometimes, however, only in one, and occurs in about twenty per cent. of those examined.

4. Its existence can usually be traced back to childhood, and is probably a congenital peculiarity.

5. The nerve of the ear concerned in the production of ear-cough is not a branch of the vagus, as Romberg and Toynbee have affirmed, but is a branch of the auriculo-temporal branch of the fifth cranial nerve.

6. This sympathy between the ear and the larynx is an example of a reflected sensation, in which the connection between the nerves involved takes place in the floor of the fourth ventricle.

7. Vomiting is occasionally, but rarely, the result of the application of an irritant to the nerve distributed to the auditory canal.

The following Cases further illustrate the exceptional causes of Winter Cough, enumerated at p. 88:—

Case LXXX.*—*Winter Cough from affection of the Naso-pharyngeal Mucous Membrane.*

W. W., aged 17, clerk, August, 1845. At the age of twelve months had whooping-cough badly, lasting from June of one year to June of the next, after which it left. Ever since this, with every cold he has had a cough, both summer and winter, of spasmodic character, (occurring in fits). Breath never affected except just after a bad fit of coughing. He has been known as the best runner at his school, and runs up and down stairs without any short breath. The cough came on last winter with a cold, and continued into this summer, not leaving till he went to Walton-on-Naze. He lost it there, and it did not return until after he came home and got wet, when it came back, and it is now bad, especially at night, rousing him with a fit of coughing out of his sleep. Expectorates pretty freely every morning, yellowish mucus. No signs of either

Emphysema or Bronchitis, no cough-sounds in the chest, but *hoarse cough-sounds and rough respiration in the larynx, fauces, and posterior nares.* No morbid heart-sounds. Soft palate, ragged and red at edges, posterior wall of fauces tumid, mucous follicles red and swollen, nostrils very tumid and discharging watery mucus freely. Cough has a laryngeal twang, chest feels tight after coughing. Hereditary rheumatism in family, urine deposits uric acid and urates. For six years after living in the valley of Kingston-on-Thames, has been subject every autumn to formation of small boils and ulcers in the nostrils, where they continue to break out, and the nostrils remain tumid till winter, interfering considerably with the nasal passage, and making the breath feel very hot. Three years ago had a gathering in the meatus of left ear, since which there has been singing and partial deafness. Left ear, tympanic extremity of meatus red and irritable, scar of small abscess; right ear very moist, and tympanum looks sodden. Rheumatic pains in right fore-finger, inclination to contraction of flexor tendons, rheumatic pains in shoulders. In this case the condition of the nasal and pharyngeal mucous membrane appears to be the cause of cough. The history, and super-resonant chest, &c., would accord with the existence of slight Emphysema, but there is no short breath and no altered breath-sound. Ordered alkaline saline of ammonia, soda, potass, and citric acid, a lozenge-pill of morphia and liquorice, and counter-irritation to the neck and behind the ears. September 4.—Cough quite gone; ordered to continue alkalies till rheumatic symptoms are gone, and paint throat with tinct. galls; syringe nose with infusion of galls. September 26.—No cough, throat looks nearly normal, nostrils still tumid. November.—Continues well and the nostrils are now so much better that he considers them well, though I can see that the mucous membrane is still thickened.

Case LXXXI.* — *Winter Cough from Pharyngeal and Tracheal Congestion.*

F. W., 56 (winter of 1864), a stout, light-haired man, formerly a sea-captain, conjunctivæ pale. Complains that for several winters he has had a bad cough, last year especially severe. It has now set in as usual with all the old characters. The cough is convulsive in character, with severe straining on the diaphragmatic attachments, often produces retching before it ceases, and leaves the chest, back and front, very sore. Not much expectoration. He is not otherwise ill. It always dates from a cold. Careful examination of the chest discovers all the sounds of percussion and auscultation to be normal. The cough-sounds do not reach the chest. The only abnormal sounds are high-pitched dry inspiratory expiratory and, especially, cough-sounds in the larynx and top of the trachea. The uvula is long and tumid, whole pharyngeal mucous membrane tumid, and this condition extends into the larynx. Treatment directed to this state of mucous membrane removed the cough. [1]

Case LXXXII.*—*Winter Cough from Chronic Thickening of the Laryngeal Mucous Membrane and Recurrent Laryngeal Congestion.*

H. W., aged 10, schoolboy, had "croup" two or three times when a baby, and has had cough off and on in winter ever since, generally with a croupy sound. This summer the cough did not leave as usual, but has continued all through; as soon as it begins to get a little better he seems to take fresh cold and it gets worse again. He has always been very ready to take cold, but the tendency increases. His mother says his breath is not short, but he says it has been shorter than other boys' for some time; he cannot run upstairs so well as others, and gets "winded" sooner in running. He says he gets hoarse very easily,

[1] For function of uvula see Appendix IV.

especially if the weather is at all damp. Damp aggravates his cough. No hereditary tendency to disease. Chest raised much in inspiration. Resonance normal. No abnormal sounds anywhere except in the neighbourhood of the larynx—traced by greatest intensity to larynx—in which both inspiration and expiration are harsh; expiration considerably higher pitched than inspiration, and expiration becomes stridulous in larynx during cough.

Diseases of the Heart.

It will be observed that I have said scarcely anything about Disease of the Heart, either as a cause or effect of Winter Cough. The reasons are simply these: that as a cause it chiefly acts as a predisposer to Bronchitis; and that as an effect, although a very important one, it has no special relation to the points upon which I have principally dwelt, and our time does not permit me to enter upon a new department of the subject which could only be fairly treated at considerable length. Under the head of treatment, however, I may be able to find room for a few practical remarks with reference to cardiac complications. (See also my work "On Affections of the Heart and in its neighbourhood; Cases, Aphorisms and Commentaries.")

Coughs and Colds.

Having now cleared the way by the discussion of some of the most important difficulties connected with the relations between Bronchitis and Emphysema, and by considering some of the exceptional cases in which neither of these states exist, let us return to the consideration of the lessons to be learnt from the facts which I have tabulated.

The first tables give the answers to the following questions relating to coughs and colds.[1]

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[1] See form of report, Appendix I.

1. What was the nature of the first attack of cough?

2. When free from cough since the first attack?

3. Is the cough aggravated by any other causes than fresh colds, and if so, what are they?

4. On catching cold, does it affect first the nose, throat, or chest?

Nature of First Attack of Cough.

TABLE III. (See Index to cases.)	Cold with Bronchitis.	Inflammation of Lungs.	Convulsive attack.	Spasmodic attack.	Whooping Cough.	Came on gradually.	First attack slight; 2nd severe neglected.	Severe Dry Cough.	Not noted, or not remembered.
White 33 Cases	27	1	0	1	1	2	0	0	1
Per Cent.....	82	3		3	3	6			3
Red 18 Cases...	7	1	0	0	0	0	1	4	5
Per Cent.....	39	6					6	22	27
Yellow 1 Case .	0	0	1	0	0	0	0	0	0
Per Cent.....			100						
Blue 6 Cases ...	4	0	0	0	0	1	0	0	1
Per Cent.....	67					16·5			16·5
Total 58 Cases	38	2	1	1	1	3	1	4	7
Approx.perCent.	66	3	2	2	2	5	2	7	12

Table III. shows the character of the first attack of cough in the different groups. In 66 per cent. of the fifty-eight cases it was described as an attack of cold with Bronchitis; and this was the case in no less than 82 per cent. of the white group. In 7 per cent of the 58 cases it was described as a severe "dry cough," which was

most probably acute Bronchitis, especially as it occurred only in the cases showing signs of Bronchitis. In the blue group—in which there were signs of Emphysema but not of Bronchitis—the first attack of cough was described as cold and Bronchitis in 67 per cent.

When free from Cough since First Attack.

Table IV. (See Index to cases.)	In Summer Weather.	When free from Cold.	Occasionally with no assignable cause.	Never.
White 33 Cases ...	15	3	0	16
Per Cent.	45	9		48
Red 18 Cases	7	0	2	8
Per Cent.	39		11	44
Yellow 1 Case	0	0	0	1
Per Cent.				100
Blue 6 Cases	4	0	0	2
Per Cent.	67			33
Total 58 Cases	26	3	2	27
Approx. per Cent.	45	5	3	47

Table IV. shows that of 40 cases of Emphysema 19 were free from Cough in summer weather, and 3 when not suffering under the effects of a cold. So that in 22 out of 40 cases, or about 55 per cent., Emphysema

could exist unaccompanied by cough; for we know that Emphysema is not a complaint which could have appeared and disappeared, again and again, as the cough did.

Is Cough aggravated by any other causes than Colds, and if so, what are they?

TABLE V. (See Index to cases.)	No.	Change of weather.	Sudden change of temperature.	Moist Air.	Fog.	Deranged Stomach.	Excitement or exertion.	Inappreciable causes.
White 33 Cases .	23	4	1	0	0	1	2	2
Per Cent.....	70	12	3			3	6	6
Red 18 Cases ...	14	0	0	0	0	2	0	2
Per Cent.....	78					11		11
Yellow 1 Case ...	0	0	0	0	1	0	0	0
Per Cent					100			
Blue 6 Cases	5	0	0	1	0	0	0	0
Per Cent.....	83			17				
Total 58 Cases ..	42	4	1	1	1	3	2	4
Approx. per Cent.	72	7	2	2	2	5	3	7

Table V. shows that the cough was not aggravated by any other causes than fresh colds, in 70 per cent. of the White Group, in 78 per cent. of the Red Group, and in 83 per cent. of the Blue Group. It appears from this table, therefore, that the cough in Emphysema becomes a prominent feature in proportion as the patient is subjected to

attacks of catarrh. This is especially seen in the Blue Cases, in which the cough was aggravated only on the occurrence of fresh cold in the largest proportion of any of the groups, and it will be further illustrated as we go on.

Whether on catching cold it affects first the Nose, Throat, or Chest.

Table VI. (See Index to cases.)	Nose.	Throat.	Chest.	Nose and throat simultaneously.	Nose and chest simultaneously.	Throat and chest simultaneously.
White 33 Cases	13	0	16	0	0	4
Per Cent.....	39		49			12
Red 18 Cases .	6	3	4	2	0	3
Per Cent.....	33	17	22	11		17
Yellow 1 Case.	0	0	1	0	0	0
Per Cent.....			100			
Blue 6 Cases...	1	0	4	0	1	0
Per Cent.....	17		67		17	
Total 58 Cases.	20	3	25	2	1	7
Approx. per ct.	34	5	43	3	2	12

The influence of catarrh is further shown by Table VI., which describes the mode of attack assumed by fresh colds in the different groups. In thirty-four per cent. of the whole series of fifty-eight cases, the colds began in the nose, and in three per cent. in the nose and throat simultaneously, so that in about thirty-seven per cent. the colds spoken of in the other tables, as accounting so largely

for the aggravation of both the short breathing and the cough, began as attacks of ordinary nasal catarrh.

The proportions in which the colds commenced at different parts of the mucous tract in the several groups are worthy of remark. Thus, in the cases of Bronchitis without Emphysema, the nose and throat take precedence in about seventy-eight per cent.; the chest in only twenty-two per cent. In the cases of Bronchitis and Emphysema conjoined, the nose and throat take the lead in about fifty-one per cent.; the chest in forty per cent. In the cases of Emphysema in which Bronchitis was only an occasional affection, the nose takes the lead in thirty-three per cent.; the throat not at all; but the chest takes precedence in sixty-seven per cent.; and in the one case unassociated with Bronchitis neither nose nor throat is mentioned, on the occurrence of cold it affected the chest at once; but this patient was not subject to colds, they only occurred on getting wet.

In forty-five per cent. of the fifty-eight tabulated cases, the cough "*left in summer weather.*" This was the case in about forty-nine per cent. of the cases of Bronchitis and Emphysema (blue and white), and in about thirty-nine per cent. of the cases of Bronchitis without Emphysema.

But the "*cough never left*" in forty-seven per cent. of the fifty-eight cases, and this happened in about forty-six per cent. of the cases of Bronchitis and Emphysema (blue and white), and in about forty-four per cent. of the cases of Bronchitis with no Emphysema (red).

Of the forty-nine per cent. of the cases of Emphysema and Bronchitis in which the cough "left in summer weather," the largest proportion belonged to the *blue group*, in which Bronchitis was not a constant attendant, being absent at the time of examination.

From these figures it would seem that it is the Bronchitis and not the Emphysema which is the essential cause of the cough, and that the presence or absence of cough under different meteorological conditions is dependent upon changes in the state of the Bronchial affection, not of the Emphysema.

We are led by these considerations to enquire whether there is anything in the circumstances connected with the two sets of cases—the forty-five per cent. in which the cough *left in summer weather*, and the forty-seven per cent. in which it *never left*—to account for this important difference. I have therefore placed in *separate* tables (VII. and VIII.) the principal facts relating to these points in the two sets of cases. Examining into the twenty-six cases in which cough left in summer, it is found that the colds to which the returns of cough were attributed *fell first upon the chest* in about sixty-three per cent. of the cases of Emphysema and Bronchitis (blue and white), and in only about fourteen per cent. of the cases of Bronchitis with no Emphysema (red); whereas the colds *first affected the nose or throat* in eighty-five per cent. of the cases of Bronchitis and *no* Emphysema, and in only thirty-seven per cent. of the cases of Bronchitis *with* Emphysema.

In the twenty-six cases in which *the cough never left*, the colds *fell first upon the chest* in about sixty-one per cent. of the cases of Bronchitis and Emphysema (blue and white), and in about sixty-two per cent. of the cases of Bronchitis and *no* Emphysema (red); whereas colds *fell first upon the nose or throat* in about thirty-seven per cent. of the red cases, and in about thirty-nine per cent. of the blue and white cases.

On comparing these two sets of facts, we see a gradual

assimilation between the cases of Bronchitis without Emphysema and those with Emphysema in respect to the way in which they are affected by colds, and that this takes place in proportion as the Bronchitis becomes a deeply-seated and abiding affection.

We find that when the cough left in summer weather, that is, when the Bronchitis was cleared up by this meteorological change, it was in the Emphysematous cases that the colds fell first upon the chest in the largest proportion. In those subject to Bronchitis alone the colds fell first upon the nose and throat, and only affected the chest by creeping down the mucous tract; so that a person whose bronchial affection is complicated with Emphysema is in a much worse position with regard to the effects of future exposure to colds than one in whom it has not become so complicated. He takes cold in the chest at once and there is no opportunity, therefore, for saving his chest by arresting the cold before it has reached it, as may be done in the case of colds beginning in the head and travelling down towards the bronchi.

But when the cough never left, that is when the Bronchitis was not cleared up by a change to warm weather, a different average prevailed; the colds which aggravated the cough fell first upon the chest in nearly the same proportion in the cases of Bronchitis without Emphysema as in those with Emphysema, viz., red, sixty-two per cent., blue and white, sixty-one per cent.

The necessary condition, then, to determine the colds to fall at once upon the chest, is the existence in the bronchi of a semi-inflamed condition—a condition of imperfectly cured Bronchitis—which keeps up a constant irritability and susceptibility to a renewal of the half-cured disease immediately an exciting cause is presented.

The only connection we are able to trace between the presence of Emphysema and the tendency of colds to fall first upon the chest, lies in the fact that, in such cases, the Bronchitis has extended deeply into the bronchial ramifications, and has become so permanently lodged in the smaller bronchi that it remains but partially cured there, even when the balmy air of summer soothes the larger bronchi and upper parts of the naso-pulmonary tract with which it comes into direct contact, and thus allays irritation and relieves the cough.

With respect to the tendency of fresh colds to fall first upon the chest, the cases of Emphysema and Bronchitis, in which the cough left in summer weather, are like the cases of Bronchitis *without* Emphysema, in which the cough never left, and like the cases of Emphysema and Bronchitis in which also the cough never left. In all three cases the colds fell first upon the chest in nearly the same proportions, viz., sixty-three per cent., sixty-two per cent., sixty-one per cent.

It is, then—and this is the important practical deduction—to the gradual creeping down of Catarrh from the nose to the throat, from the throat to the bronchi, and from the large bronchi to the smaller ramifications, and to the greater and greater difficulty of eradicating the disease as it gets deeper and deeper, that our special attention must be directed. Thus we see the importance of leaving no means untried which can give a chance of radically and permanently removing every lurking trace of Bronchitis, before we let a patient consider himself safely cured, in every attack of this disease that comes before us for treatment. (See Lect. VI., VII., VIII., IX.)

We must not be satisfied because the cough is better or even if it has left; for we have seen that this may be

the case, under favourable atmospheric influences, and yet enough disease lurk behind to bring it back with the first return of an irritating cause. We must only be satisfied when, by all our methods of examining and testing the respiratory powers, we cannot detect a lingering trace of disease in the bronchial mucous membrane, and even then we have to consider by what means we can maintain this condition till it has become habitual. (See Lect. VI., VII., VIII., IX.)

I must remind you here of all that I have already attempted to prove respecting the causation of Emphysema, and of the important position which neglected Bronchitis and obstructed bronchial tubes hold in the category of causes.

TABLE VII.—*Free from Cough in Summer*

No. and Colour of Case.	Whether Breath has been other than short since it began to be short.	State of Breath between attacks of cough.	Whether Cough is aggravated by any other causes than Colds.
2 White.	It was always short.	Short.	Going from hot to cold, or cold to hot.
14 White.	Yes; in summer.	Very short.	No.
16 Red.	Yes; only short at long intervals.	No answer.	When stomach is deranged.
18 Red.	Worse in foggy weather.	Easy.	Yes; frequently cough without fresh cold.
19 Blue.	Much worse in bad weather.	No answer.	No.
21 Red.	Yes; only short with cough or excitement.	Good, unless excited.	No.
22 White.	No; always short in hot rooms, during exercise or stooping.	Generally good.	No.
23 White.	Yes; in summer.	Short in winter.	No.
26 White.	Yes.	Middling.	No.
28 White.	Yes; scarcely short in summer.	Very short at times.	No; except over-exertion.
29 Red.	Yes; only short with cough.	Good.	Yes; heavy suppers and indigestible food.
32 Red.	Yes; only short in winter.	Rather short in winter.	No.
35 White.	No; worse with colds.	Short.	No.
39 Red.	Yes; in summer.	No answer.	No.
40 White.	Yes; at times, in clear, fine weather.	Rather short; varies with weather.	No.
41 White.	Yes; in mid-day in summer.	Short.	No.
43 Red.	No.	Quite well till 2 years ago.	No.
46 White.	Yes, if free from cold.	Much less short.	No.
48 Blue.	No; better and worse.	Not short till after last attack.	Moist atmosphere.
51 White.	No.	Varies.	Fog.
52 White.	Yes; in summer.	Well.	No.
53 Blue.	Yes; in summer.	Rather short of late.	No.
56 White.	Yes; in summer.	Short.	Excitement.
57 Blue.	No; always bad from dust or fast walking.	Very short.	No.
58 White.	No; worse with every cold.	Short.	No.
59 White.	Yes; from March to September.	Very short from September to March.	No.

Cases in which Cough

Colds fell first on Chest in 63 per cent., Blue and White.
" " 14 " Red.

Weather in 26 of 58 Cases = 45 per Cent.

What gives Cold most easily, what most often.	Symptoms of attack of Cold which leaves Cough.	Whether Cold affects first nose, throat, chest.
Damp and draughts.	Strangling pains in throat and wind-pipe.	1st throat, 2nd chest.
Wet weather.	Colds and chills.	Chest and throat.
East winds, and draughts while hot.	Cold in nose and eyes, going to chest in 24 hours.	1 nose and eyes, 2 throat, 3 chest.
Draughts and night air.	Rigors.	1 throat, 2 nose and head, 3 chest.
Damp weather.	Oppression at front of chest, soon followed by running at nose and cough.	Nose and chest simultaneously.
Change from heat to cold.	Tightness at chest and throat, with no cold in head.	Chest.
Draughts.	Running at nose, and sense of cold in nostrils on inhaling.	1 nose and head, 2 chest.
Sudden change of temperature ; getting wet.	Hoarseness.	1 chest.
Wet feet.	Rigors.	1 chest.
Cold winds.	Soreness at chest.	Chest ; head seldom affected.
Damp feet and night air.	Dry huskiness in throat.	Nose, head, and throat at once.
Night air.	Irritation in throat.	1 throat, 2 chest, seldom any cold in head or nose.
Sudden change of temperature ; draughts.	Cold and running in eyes and head,	Sometimes running cold in head first, sometimes chest.
Draughts and damp.	Running cold.	1 nose, 2 throat, 3 chest.
Damp and fog.	Rigors.	1 nose and eyes, 2 chest.
Wet and draughts.	Pain at chest and difficult breathing.	Chest.
Sharp winds ; wet feet.	Cold in head.	1 nose and eyes, 2 chest.
Damp and fog ; change of weather.	Tightness at chest, short breath, much phlegm.	Throat and chest.
Very slight changes of temperature.	Running cold, with fever and soreness in chest and throat.	1 nose and head, 2 throat and chest.
Cold, foggy, or night air.	Soreness in chest.	Chest.
Change of weather.	Cold in head.	Nose and head.
Wet feet or draughts.	Languid feeling.	Chest.
Wet.	Rigors.	Chest.
Damp and draughts.	Cold in nose and chest.	1 nose, 2 chest.
Fog.	Stuffing of nose and chest, short breath, no running cold.	1 nose, 2 chest.
Currents of cold air, and many other causes.	Cold in nose and head, weakness, pains in limbs, low spirits.	Nose and head.

left in Summer Weather.

Cold fell first on Nose or Throat in 37 per cent., Blue and White.
" " " 85 " Red.

TABLE VIII.—*Never free from Cough*

No. and Colour of Case.	Whether Breath has been other than short since it began to be short.	Things most inclined to make Breath short.	Date and nature of first attack of Cough; how long before or after short Breath.
1 Blue.	Yes; in summer.	Accumulation of phlegm.	7 yrs. ago, 3 yrs. before short breath, came by degrees, worse year by year.
5 White.	No.	Getting cold.	Bronchitis, bad attack, left short breath.
7 Blue.	Yes; in summer.	Fog and fast walking.	14 yrs. ago, 7 yrs. before short breath, pleurisy and rheumatic fever, 7 yrs. ago, second attack.
9 White.	No; short with every cough.	Cough.	14 yrs. ago, attack of inflammation of lungs, cough and short breath since.
10 Red.	No.	Damp weather.	Tickling cough since a boy.
12 Red.	No.	No answer.	7 yrs. ago, 1 week before short breath, severe cold.
13 Red.	Yes; for a month or two in summer.	Atmospheric changes.	12 yrs. ago severe congestion of lungs. Breath short 7 yrs. before, after confinement.
15 White.	No.	Colds.	20 yrs. ago, tickling cough in throat, produced short breath.
17 White.	No.	Exertion.	2 months ago, 5 yrs. after, short breath, bad cold and stoppage in nose.
24 White.	No.	Running or fast walking.	3 yrs. ago, 1 yr. after short breath, spitting large quanties of phlegm.
25 Red.	No; but worse at times.	Chills.	A little cough since childhood, worse last 2 yrs. with paroxysm of dyspnœa.
27 White.	Yes, rarely.	Cold.	10 yrs. ago, same time as short breath, from exposure.
31 White.	Yes; only short with cough.	Cough only.	Cough from infancy, but at 3 bronchitis, worse since; now 19.
33 White.	Yes; between attacks of cold.	Colds.	Always subject to coughs, bad attack with cold 2 yrs. ago, before short breath.
34 White.	No; not for 3 or 4 years.	Slightest exertion.	12 yrs. ago, just before short breath, slight at first, worse and worse.
36 Red.	Not short.	No answer.	12 yrs. ago, violent cold.
38 White.	Yes; in summer.	Colds.	5 yrs. ago cold, inflammation of lungs, followed by short breath.
42 White.	No; but better and worse.	Change of weather—dust.	28 yrs. ago, same time as short breath, tightness at chest.
44 White.	No.	Exertion.	9 yrs. ago, same time as short breath, violent strangling cough.
45 Red.	No.	Cold weather.	Severe cough all life.
47 White.	Yes; in summer.	Exertion.	9 yrs. ago, same time as breath.
49 Red.	Yes; in summer.	Fog and Damp.	7 yrs. ago, cold and cough.
50 White.	It was better for 5 yrs. after first got bad 20 yrs. ago.	Exertion.	20 yrs. ago, same time as short breath, cold and cough.
54 Red.	No; but only bad when the cough comes.	Colds & coughs, susceptibility increases.	4 yrs. ago, same time as short breath, very severe cold and cough.
55 White.	No.	Colds.	4 yrs. ago, same time as short breath, severe cold.
62 White.	No.	Colds.	Always subject to colds and coughs, worse last 6 months.

Cases in which

Colds fell first on Chest in 61 per cent., Blue and White.
" " " 62 " Red.

in 27 of 58 Cases = 47 per Cent.

Whether Cough is aggravated by other causes than Colds.	What gives Cold most easily, what most often?	Symptoms of attack of Cold which leaves cough.	Whether Cold affects first nose, throat, or chest.
No.	Changes in weather, especially foggy and cold weather.	Chilliness.	Chest.
No.	Getting wet.	Pain at chest.	Chest.
No.	Wet feet, draughts.	Rigor.	Chest.
Yes; change of weather.	Damp feet, draughts.	Sneezing and cramp in chest.	Nose and head.
No.	Change of weather.	Weakness & languor.	Chest and throat.
No.	Change of weather.	Tightness at chest.	Head and nose.
No; had severe influenza 29 yrs. ago.	Perspiration after slight exertion.	Pains in chest and back.	Violent running of nose and hoarseness in throat.
No.	Wet and fog.		Chest.
No.	No answer.	No answer.	1 nose, 2 chest, not subject to colds.
No.	Wet feet, cold winds.	Copious expectoration.	Chest.
No.	Damp feet, exposure to weather.	The slightest cold leaves a cough.	Chest.
Yes; dense foggy air will bring it on in night if weather changes.	Draughts.	Drowsiness and headache.	Nose and head.
Yes; at times very bad, without cold.	Damp, especially N.E. wind, nothing like damp.	Pains in side and shivering.	1 chest, 2 throat, 3 head.
No.	Change of weather, draughts.	Slightest cold gives running at nose, sneezing, and cough.	Most often nose first, sometimes not.
Yes; at times without apparent cause.	Change of weather.	Difficulty of breathing.	Chest and throat, not nose.
No.	Wet and cold.	Cold in chest.	1 throat, 2 chest, not head.
No.	Heats and colds, change of weather.	Cold in chest.	Chest.
No.	Change of weather.	Shortness of breath, increased by cold.	Chest.
No.	Damp, fog.	Influenza cold, and when running stops cough comes on.	1 nose, 2 head, 3 chest.
No.	Damp weather.	Short breath.	Chest.
Wet and fog—clear frost relieves.	Cold wind.	Headache and tightness at chest.	Chest.
Always worse in winter.	Damp and fog.	Pains betw. shoulders.	Chest.
No.	Fog and damp, overheating.	Pains in chest and back.	Chest.
No.	Change of weather.	Running at nose, sneezing, soreness at throat and chest.	1 nose, but soon goes to chest.
No.	Wet feet, draughts.	Bleeding from nose.	1 nose, 2 chest.
Exertion.	Draughts.	Colds.	1 nose and head, 2 chest.

Cough never left.

Colds fell first on Nose or Throat in 39 per cent. Blue and White.
" " " " 37 " Red

LECTURE V.

Short breath ; effects of summer weather and other influences.—Tables IX., X.—Illustrative Cases.—Cause of short breath in Bronchitis.—Influence of conditions of life upon Winter Cough, and of Bronchitis and Emphysema upon the spirits.—Tables XI., XII., XIII., XIV., XV.—Climatic influences ; their importance.—Causes of cold.—Table XVI.—Genealogy.—Tables XVII., XVIII., XIX., XX., XXI., XXII.—Conclusions as to hereditary transmission, etc.

Passing from the questions relating to the coughs and colds, we come to those which concern the short breathing :—

1. Has the breath been other than short since it began to be short, and if so, when and why?

2. What are the things most inclined to make the breath short?

Whether breath has been other than short since it began to be short.

Table IX.	Yes ; in summer weather.	Yes; between attacks of cough.	Only short after coughing.	Only short occasionally.	No; but better and worse.	No.	Not short.
White 33 Cases	9	3	0	0	0	21	0
Per Cent.	27					64	
Red 18 Cases	4	0	2	3	0	7	1
Per Cent.	22		11	17		37	6
Yellow 1 Case.....	0	0	0	0	0	1	0
Per Cent.						100	
Blue 6 Cases	4	0	0	0	2	0	0
Per Cent.	67				33		
Total 58 Cases.....	17	3	2	3	3	29	1
Approx. per Cent....	29	5	3	5	5	50	2

Things most inclined to make Breath short.

TABLE X.	Exertion.	Change of weather.	Cold weather.	Damp or Fog.	Dust or hot rooms.	Cough only.	Getting cold.	Phlegm accumulating.	Not short.
White 33 Cases	9	2	0	9	2	2	9	0	0
Per Cent.	27	6		27	6	6	27		
Red 18 Cases ..	4	2	4	3	0	0	4	0	1
Per Cent.	22	11	22	17			22		6
Yellow 1 Case.	1	0	0	0	0	0	0	0	0
Per Cent.	100								
Blue 6 Cases...	3	0	0	2	0	0	0	1	0
Per Cent.	50			33				17	
Total 58 Cases	17	4	4	14	2	2	13	1	1
Approx. per Ct.	30	7	7	24	3	3	22	2	2

Table IX. shows that out of 40 cases of Emphysema, 13 stated that they had been free from short breath "in summer weather," and 3 "between the attacks of cough." So that in 16 out of 40 cases, or 40 per cent., Emphysema appears to have existed either without necessitating shortness of breath; or, at least, without a sufficient amount of shortness of breathing to be observable by the patient.

On further examining Table IX. we find that, whereas the short breathing was so much relieved by summer weather, as to be said by the patients not then to exist; in 29 per cent. of 58 cases, the short breathing was not

so relieved, but remained permanent summer and winter in 51 per cent.

The relief by summer weather occurred in the different groups of cases in the following proportions, viz.:—

Blue group	.	.	.	67 per cent.
White „	.	.	.	27 „
Red „	.	.	.	22 „

It appears, then, that the greatest per centage of relief to short breathing by summer weather occurred in the blue group—the cases in which there was history of previous Bronchitis but none present at the time of examination, in which, therefore, Bronchitis was an occasional but not a constant attendant; and this occurred in the same proportion, viz., 67 per cent., as that in which the same group of cases were relieved of cough by summer weather; and Table X. shows that "fog and damp," the common excitors of Catarrh, were the things most inclined to make the breath short in 33 per cent. of these same cases. It is probable, therefore, that the short breath and the cough were both due to the same state, viz., Bronchitis, which we have already found from the other cases to have been the essential cause of cough. But we find (Table IX.) that in 7 cases, or 37 per cent., of the Red Group, in which Bronchitis existed with no Emphysema, the breath never ceased to be short; and in 3 of the same group, or 17 per cent., the breath was "only short occasionally." Let us examine the abstracts of the cases, therefore, to see if there are any circumstances which can explain these three different conditions of breath in the same group of cases, viz.:—

Breath relieved by summer weather			.	22 per cent.
„ never relieved	.	.	.	37 „
„ only occasionally short			.	17 „

We can have no difficulty in understanding that the short breath of Bronchitis should be relieved by the soothing influence of warm summer air upon the mucous membrane. It will not be necessary, therefore, to go through these cases; but that it should *not* be so relieved needs some explanation; and on examining the following Extracts from the cases, we find the probable solutions of the difficulty :—

In Case III. the cough had commenced about two and a half years ago, breath had been short at the time, and both had got better afterwards; but since twelve months the Bronchitis and short breath had not been relieved, a severe attack having occurred at that time, which, having been neglected, had crept down into the finer tubes; and, although the breath was never other than short during the last year, both that and the cough were aggravated by all unfavourable changes of weather. Short breath was due, therefore, to the *deep seat of the bronchial affection*, and to the consequent persistence of congestion and tumidity of the mucous membrane.

In Case X., although the cough had existed for about forty winters, the breath had not been short more than three or four years, dating from a more than ordinarily severe cold with pains in the chest, during which it was evident that the bronchial affection *had crept deeper down*, and that a permanently thickened condition of the mucous membrane had been established.

In Case XII. the permanent short breath was due to the deep-seated character of the Bronchitis. The patient was subject to aggravations of dyspnœa, due to spasmodic closure of the bronchi when irritated by fresh accessions of cold.

In Case XXV. the breath was "always short, but

specially so at times." Although he had had a cough all his life in winter, the breath had only been getting short five years, and had especially been worse the last two years, during which time the cough had been worse and more abiding, and he had become subject to paroxysms of dyspnœa. There was a question in this case as to the existence of a fatty heart, which might account for the paroxysmal dyspnœa, but the permanent short breath was evidently due to slight but abiding *deep-seated Bronchitis*.

In Case XLIII. there had been Winter Cough for sixteen years, but the breath had only become permanently short for two years, and in this, as in the other cases, its permanence was explained by the Bronchitis having *taken a deeper seat* than heretofore since a more than usually severe cold two years ago.

In Case LIV. the breath had always been rather short, but not *bad* unless the cough was troublesome. The cough had never left since it began in a very severe attack of Bronchitis; every cold had aggravated it, and these colds became more and more frequent, showing an abiding condition of tumidity and irritability of the mucous membrane extending into the smaller tubes. That the patient had not yet become Emphysematous was, probably, due simply to want of time for such a state to be developed, her habits being quiet and sedentary and thus not putting much strain upon the breathing.

In Case XLV. the cough had existed many years—"all his life"—in winter, but the short breath dated from Influenza ten years ago, when the Bronchitis got a deeper seat and left such a susceptibility of the mucous membrane to Catarrh, that, although the breath always got better if the cough did, fresh colds were so easily excited that he never was free, and latterly a tendency to spasmodic contraction of the tubes had been set up as a complication.

In all of these cases, then, we find the explanation of the want of relief to the short breath in the same causes as in the want of relief to the cough, viz., *the deep seat of the bronchial affection* and its aggravated character, the mucous membrane having lost its power to recover under the soothing influence of summer weather. Except in those cases in which the tendency to spasmodic action was added, there was no reason to attribute the permanent short breath to any other cause than *permanent diminution in the calibre of the bronchi* by abiding deep-seated Bronchitis.

But now, what shall we say of the cases in which the short breath was only an occasional occurrence? Can we find in them why it was short on these special occasions? They were Cases XVI., XXI., XXXVII.

In Case XVI. the cough had existed twenty years; for some time it was only a Winter Cough, but latterly it had not altogether left in summer. But the breath was not perceptibly short, except on some special occasions when either unusually cold weather produced temporary tumidity of the naso-pulmonary mucous membrane, or when some cause of unusual physical exhaustion caused a failure of the action of a somewhat thin-walled heart. The worst instance of short breathing had been brought on by a severe attack of dysentery following great mental anxiety.

In Case XXI. the breath was "not short unless the heart was made to palpitate" by severe fits of coughing, by excitement, or by hurried exercise. The patient's general health was delicate, and she was anæmic.

In Case XXXVII. the breath was "only short at intervals but gets more frequently so." The description

of the symptoms shows that they were spasmodic attacks excited by fogs and damp weather.

These, then, were exceptional cases in which the bronchial affection was not sufficiently severe to produce short breath, but in which some superadded conditions—as anæmic palpitation, tendency to spasmodic asthma, and a thin-walled heart—subjected the patients to attacks of dyspnœa under certain combinations of circumstances.

We come back, then, to the leading point of importance —THAT WHEN THE BREATH IS SHORT IN BRONCHITIS IT IS FROM DIMINISHED CALIBRE OF THE NASO-PULMONARY AIR PASSAGES. When it is only short in winter, it is because this condition is still susceptible of relief by summer weather. When it is permanently short, it is because the affection of the naso-pulmonary tract has crept down into the deeper recesses of the lungs, and become a more severe and abiding affection. And, putting all these sets of cases together, we see that these same conditions of the naso-pulmonary tract are the principal causes of variations in the degree and in the persistency of the short breathing, whether the Bronchitis is complicated with Emphysema or whether it is not. In a word—that although Emphysema is unquestionably a cause of short breath, and, in the most severe cases of the disease, a very serious cause, yet that bronchial disease — diminished calibre of the naso-pulmonary passages — is the condition which claims our most important consideration. Emphysema is but a vestige of which diminished calibre of the air-cells is the commonest cause. (See Treatment.)

CONDITIONS OF LIFE.

The influence of the conditions of life upon Bronchitis and Emphysema is partially illustrated in Tables XI.,

XII., XIII., XIV., XV. Table XI. shows that 43 per cent. of the 58 patients smoked tobacco, and Table XII. shows that in these twenty-five persons who smoked it "eased the cough" in 4 per cent., "aggravated it" in 16 per cent., "promoted expectoration" in 24 per cent., and "had no effect either upon the cough or the short breathing" in 56 per cent.

In the majority of cases, then, it had no effect, and in the rest the effects were pretty equally divided between good and bad, with a slight preponderance on the side of good, except in the case uncomplicated with Bronchitis, and in that the only effect was to aggravate the cough. So far, then, as these cases are concerned,

Whether Tobacco was Smoked.			Effects of Tobacco on the Cough and Breath in the 25 Cases in which it was Smoked.				
Table XI. (See Index to Cases.)	Yes.	No.	Table XII.	Eases cough.	Aggravates cough.	Promotes expectoration.	No effect.
White 33 Cases	16	17	White 16 Cases	1	1	4	10
Per Cent.....	48	52	Per Cent.....	6	6	25	63
Red 18 Cases...	5	13	Red 5 Cases....	0	1	1	3
Per Cent.....	28	72	Per Cent.....		20	20	60
Yellow 1 Case..	1	0	Yellow 1 Case..	0	1	0	0
Per Cent.....	100		Per Cent.....		100		
Blue 6 Cases ...	3	3	Blue 3 Cases....	0	1	1	1
Per Cent.....	50	50	Per Cent.....		33	33	33
Total 58 Cases	25	33	Total 25 Cases.	1	4	6	14
Approx. per Ct.	43	57	Approx. per Ct.	4	16	24	56

there is no reason to connect tobacco-smoking with them at all in the relation of a cause of the diseases; its effects were so slightly marked that it would appear to be a thing which may be safely left to the patient's taste whether it be used or not. It may be worth while to observe here, that it makes a great difference in the effect upon patients' coughs and breathing, whether they smoke the tobacco themselves, and thus get the soothing properties with the carbonaceous smoke, or only remain in the presence of others who are smoking, and thus get little else than the carbonaceous smoke. Many who can smoke with pleasure are much irritated in their coughs and distressed in breathing by the smoke of others.

The Quantity of Fermented Liquors taken habitually.

Table XIII. (See Index to Cases.)	None.	Moderate.	Excessive.
White 33 Cases	6	25	2
Per Cent.	18	76	6
Red 18 Cases.....	3	13	2
Per Cent.	17	72	11
Yellow 1 Case.....	0	1	0
Per Cent.		100	
Blue 6 Cases	3	3	0
Per Cent.	50	50	
Total 58 Cases	12	42	4
Approx. per Cent. ...	21	72	7

Table XIII. shows that 72 per cent. of the 58 patients took fermented liquors in moderation, 7 per cent. took them to excess, and 21 per cent. took none at all. From these results it does not appear that there is any special relation between the influence of alcohol and the diseases in question.

From Table XIV. it is seen that 98 per cent. of the 58 patients lived regular lives. The details of the cases showed that they all lived upon ordinary mixed diet of meat, vegetables, and bread; that their hours for meals and for work presented nothing worthy of special remark; and that the descriptions given of the rooms in which

Whether Living is regular and Spirits good or bad.

Table XIV. (See Index to Cases.)	Habits of Life.		Spirits.	
	Living regular.	Living irregular.	Spirits good.	Spirits bad.
White 33 Cases.	33	0	19	14
Per Cent.	100		58	42
Red 18 Cases ...	17	1	17	1
Per Cent.	94	6	94	6
Yellow 1 Case...	1	0	0	1
Per Cent.	100			100
Blue 6 Cases ...	6	0	1	5
Per Cent.	100		17	83
Total 58 Cases..	57	1	37	21
Approx. per Cent.	98	2	64	36

they lived by day or by night did not contain any particulars of importance.

The right-hand half of Table XIV. shows the habitual state of the spirits in the several groups of cases, and it may claim a word in this place before passing to the next Table. In the 58 cases the spirits were good in 64 per cent. and bad in 36 per cent. But a very marked difference is seen in the different groups; thus, in the cases of Emphysema, with history of only occasional attacks of Bronchitis, and no present symptoms of it (Blue), the spirits were bad in 83 per cent.; whereas in the cases of Bronchitis conjoined with Emphysema (White) they were bad in only 42 per cent.; and in those of Bronchitis uncomplicated with Emphysema (Red) they were bad in only 6 per cent. In the one case of Emphysema, unassociated with Bronchitis, past or present, they were bad. It would seem, therefore, that in proportion as the Emphysema predominated over the Bronchial affection, the spirits were depressed. This may have been due to the fact that the symptoms of Bronchitis are more apt to get better and worse, and thus to render the patient's sufferings less monotonous than in Emphysema.

Table XV. shows the occupations of the 58 hospital patients whose cases were tabulated, and as a correct statement of facts it may be of use when added to other tables of a similar kind; but as the 58 patients followed 27 different kinds of occupation, and no more than 7 followed any one of them, and that was domestic, the next highest number being 6, which was needlework, I do not think any conclusions as to the effect of occupation upon Winter Cough can be drawn from these numbers alone. They must be considered rather as representing the proportions of the different classes of poor persons who seek relief at public

charities. For influence of occupation see "Transactions of National Association for Promoting Social Science," and special treatises on the subject.

TABLE XV. (See Index to Cases.)	OCCUPATION.																								
	Domestic.	Shoemaker.	Smith.	Driver.	Ostler.	Shopman or Shopwoman.	Clerk.	Seamstress.	Engineer.	Laundress.	Baker.	Brasscutter.	Plumber.	Goldsmith.	Carpenter.	Sewing Machinist.	Missionary.	Messenger.	Policeman.	Artificial Florist; no arsenic.	Bookworker.	Collector.	Cooper.	Distiller.	Boxmaker.	Tailor.	Brushmaker.
White	4	3	1	3	1	4	1	5	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Red	2	0	0	0	0	0	1	1	0	0	0	0	0	0	1	2	1	1	1	1	3	1	1	1	1	0	0
Yellow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Blue	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Total	7	4	1	4	1	4	3	6	3	1	1	1	1	1	2	2	1	1	1	2	3	1	1	1	1	2	2

CLIMATIC INFLUENCES.

We come now to a much more important class of influences than any of the conditions of life at present mentioned, viz., such as may be generally denominated climatic. These we find scattered through most of the tables, and they may be enumerated as follows:—summer weather, change of weather, cold weather, damp and fog or moist air, sudden changes of temperature, draughts of cold air, cold winds, wet feet, getting wet.

To take these *seriatim*, and collect some accounts of their influences from the tables:—

1. *Summer Weather* produced freedom from cough in 45 per cent. of the 58 cases; relieved the short breath in 29 per cent.
2. *Change of Weather* was the thing most inclined to make the breath short in 7 per cent. of the 58 cases; aggravated the cough in 7 per cent.

3. *Cold Weather* was the thing most inclined to make the breath short in 7 per cent. of the 58 cases.
4. *Damp and Fog or Moist Air* [1] were the things most inclined to make the breath short in 24 per cent. of the 58 cases; aggravated the cough in 4 per cent.; were the most potent causes of fresh colds in 19 per cent.
5. *Sudden changes of Temperature and Draughts of Cold Air* aggravated the cough in 2 per cent. of the 58 cases; were the most potent causes of fresh colds in about 37 per cent.
6. *Cold Winds* were the most potent causes of fresh colds in 10 per cent. of the 58 cases.
7. *Wet Feet and Getting Wet* were the most potent causes of fresh colds in 31 per cent. of the 58 cases.

We have already seen from Tables V. and X. that fresh colds were the only causes which aggravated the cough in 72 per cent. of the 58 cases, and that they were the especial causes of short breath in 22 per cent.; and Table XVI. shows what are the most frequent and potent causes of these fresh colds, to which so much mischief is attributed. They are wet feet in 17 per cent. of the fifty-eight cases, getting wet in 14 per cent., cold winds in 10 per cent., draughts of cold air in 16 per cent., fog and damp in 19 per cent., sudden changes of temperature in 21 per cent.

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[1] It is worthy of note that fog, damp, and moist air are almost invariably found together, producing similar effects, as though the moisture of the foggy air were the injurious element.

What gives Cold most easily.

TABLE XVI. (See Index to Cases.)	Wet Feet.	Getting Wet.	Cold Winds.	Draughts of Cold Air.	Fog & Damp	Night Air and Draughts of Cold Air.	Sudden Changes of Temperature.
White 33 Cases	5	5	3	6	7	0	7
Per Cent.[1]	15	15	9	19	21		21
Red 18 Cases	3	2	3	0	3	2	5
Per Cent.	17	11	17		17	11	28
Yellow 1 Case[2]		1					
Per Cent.		100					
Blue 6 Cases	2	0	0	3	1	0	0
Per Cent.	33			50	17		
Total 58 Cases.....	10	8	6	9	11	2	12
Approximate per Cent.	17	14	10	16	19	3	21

[1] In Five Cases "Draughts of Cold Air" was joined with Wet or Wet Feet.
[2] Not subject to Colds.

A conclusion of a practical kind is very forcibly brought out by these results, viz., that persons suffering from Winter Cough might have hoped for immense relief from their sufferings through such protections from these very simple climatic influences as were to have been provided by the proposed "Crystal Sanatorium." (See Treatment and Lect. IX. on Change of Climate.)

GENEALOGY.

Our next subject is the tendency of Emphysema and Bronchitis to become hereditary, and to affect collaterals. With some difficulty I have succeeded in constructing

Tables which, I believe, present the facts in their true light; and I venture to suggest that the adoption of a similar form of table by other observers when registering family history will be found convenient, and calculated to prevent mistakes as to the real influence of the hereditary and collateral tendencies of diseases.

It is necessary here to point out that the words "Asthma" and "Asthmatic," when used in reference to family history, are to be understood in their broadest popular sense; that being the nearest to the truth that can be obtained when depending for the accounts of past diseases upon the reports of non-medical persons, which must usually be the case. In these Tables, then, "Asthma" must be considered to mean cough and short breath of a chronic kind, from whatever cause proceeding, except that the greatest care was exercised in making the enquiries, to include no cases under this head that could better be classed as "Consumption" or "Heart disease," for each of which a separate heading was provided.

The cases in which both parents were affected with the same disease have been kept distinct from those in which only one was affected, and every individual is marked according to sex. The brothers and sisters (collaterals) of the patient are marked as individuals according to sex, and also distinguished according to the case to which they belong.

The total numbers of collaterals in each case are also distinguished according to sex. The sex of the patients is also stated. It can therefore be seen at once (*a*) in how many cases one or both parents were affected by the diseases mentioned; (*b*) in how many cases one or more male or female collaterals were affected; and (*c*) in how many cases one or both parents, and one or more male or

female collaterals, *escaped* the diseases. And it can also be seen (*d*) how many individuals of either sex—including the patient, the parents, and the collaterals—were affected by the diseases tabulated.

Table XVII. gives the details of the thirty-three cases of Emphysema and Bronchitis conjoined (White, see p. 3).

Table XVIII. gives the details of the eighteen cases of Bronchitis without Emphysema (Red), and Table XIX. those of the one case of Emphysema with neither present Bronchitis nor history of its previous occurrence (Yellow).

Table XX. gives the details of the six cases of Emphysema with history of previous Bronchitis, but no signs of present Bronchitis (Blue).

In these four Tables the details of each group may be seen separately.

Table XXI. comprises in one table a summary of the details as affecting the whole fifty-eight cases.

The facts contained in these tables are too numerous and complicated to be all discussed or even enumerated now, but I may mention the following as among the results which may be most readily obtained from them :—

1. In the 58 cases of Winter Cough, one or both parents were asthmatic in 29 per cent.
   Neither parent was asthmatic in 71 per cent.
2. In the 52 of these cases in which there were collaterals, from 2 to 3 collaterals were asthmatic in 21 per cent.
   No collateral was asthmatic in 79 per cent.
3. In the 39 cases of Emphysema with signs of present Bronchitis, or history of previous Bronchitis (White and Blue), one or both parents were asthmatic in 28 per cent.

TABLE XVII.—*Family History in* 33 *Cases.*

White (see p. 3).		Asthma (popularly so called).						Total Number of Collaterals in each Case.	
		Parents.				Collaterals.			
		One.		Both.					
Sex of Patient.	Number of Case.	M.	F.	M. & F.		M.	F.	M.	F.
F	2	1				...		1	0
F	5		...			...		3	1
M	9		...			...		4	3
M	14		...			2		2	2
M	15		...			...		1	1
F	17		...			...		1	4
M	22		...			...		3	3
M	23			1	1		1	0	1
M	24		...			...		1	1
M	26		...			...		2	4
M	27		...			...		0	1
F	28	1				1	4	3	5
M	30		...			...		4	5
F	31		...			...		3	0
M	33		...			...		0	0
F	34		...			...		3	2
F	35	1					2	1	5
M	38		...			...		3	3
F	40		...			1		4	2
M	41		...			...		0	0
M	42		...			...		1	4
F	44		...			...		1	4
M	46		...			...		2	0
M	47			1	1	1	1	3	3
M	50		...			...		0	0
F	51		...			...		3	4
F	52		...			...		2	0
M	55		...			...		1	1
M	56		...			...		2	4
F	58		...			...		3	5
M	59	1				...		11	9
M	61	1				...		3	4
M	62		...			...		0	0
Persons...241		3	2	2	2	5	8	61	81
Cases..... 33		5		2		6		29	

TABLE XVIII.—*Family History in Eighteen Cases.*

Red (see p. 3).		Asthma (popularly so called).						Total Number of Collaterals in each Case.	
Sex of Patient.	Number of Case.	Parents. One. M.	F.	Both. M. & F.		Collaterals. M.	F.	M.	F.
F	3	...				...		2	1
M	10	...				...		0	0
F	12	...				...		6	7
F	13			1	1	1	3	2	5
M	16	1				...		1	2
M	18	...				6		6	3
F	21	...				...		4	3
M	25	...				1		4	2
M	29	...				...		3	2
M	32	...				...		3	6
F	36	...				...		1	2
M	37	...				...		6	2
M	39	1					2	4	2
F	43			1	1	...		0	2
M	45	1				...		1	4
F	49	1				...		11	0
F	54	...				...		3	7
F	60	...				...		1	3
Persons ... 165		2	2	2	2	8	5	58	53
Cases ... 18		4		2		4		17	

TABLE XIX.—*Family History in One Case.*

Yellow (see p. 3).				
M	20	...	...	11 2
Persons ... 16		...	...	11 2
Cases 1		...	...	1

TABLE XX.—*Family History in Six Cases.*

Blue (see p. 3).		Asthma (popularly so called).				Total Number of Collaterals in each Case.	
Sex of Patient.	Number of Case.	Parents. One. M.	F.	Both. M. & F.	Collaterals. M.	F.	M.	F.
F	1		1		...		3	2
M	7	1			4		4	2
M	19	1			...		7	5
M	48	1			...		0	0
M	53			...	...		2	4
M	57			...	...		1	1
Persons ... 49		3	1		4		17	14
Cases 6		4			1		5	

TABLE XXI.—*Summary of the Family History of* 58 *Cases of Winter Cough. For particulars of each Group (White, Red, Yellow, Blue) see other Tables.*

Disease.	Winter Cough.				Asthma (popularly so called).					
Description	Patients. Total.		Parents. Total.		Collaterals. Total.		Parents. One.		Both.		Collaterals.	
Sex	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Persons ...	36	22	58	58	147	150	8	5	4	4	17	13
Cases	58		58		52 1		13		4		11	

The total number of individuals concerned in this history is 471, of whom 241 were males, and 230 females.

No collaterals in six cases out of fifty-eight.

4. In the 34 of these 39 cases in which there were collaterals, 2 collaterals were asthmatic in 21 per cent.
5. In the 18 cases of Bronchitis without Emphysema one or both parents were asthmatic in 33 per cent.
6. In the 17 of these cases in which there were collaterals, 3 collaterals were asthmatic in 24 per cent.

Or if, instead of calculating the percentage per number of cases, we calculate it per number of individuals concerned, we have the following results :—

TABLE XXII.—*Asthmatic tendency in* 455 *persons.*[1]

GROUPS OF CASES.	CLASS OF PERSONS.	Total Number of Persons.	Number of Asthmatics	Per centage of Asthmatics to total number of Persons.
White and Blue Groups combined (Bronchitis and Emphysema)...	Patients .. 39 Parents ... 78 Collaterals 173	290	69	About 27 per Cent.
Red Group ..... (Bronchitis and no Emphysema)	Patients .. 18 Parents ... 36 Collaterals 111	165	39	About 24 per Cent.
Totals	Patients ... 57 Parents ...114 Collaterals 284	455	108	About 24 per Cent.

Of the 78 parents concerned in the White and Blue Groups only 13 were asthmatic, or nearly 17 per cent.

Of the 36 parents concerned in the Red Group 8 were asthmatic, or 25 per cent.

So far, therefore, as we can be guided by these cases,

[1] The 16 persons included in the Yellow Group are omitted.

we are led to the conclusion that it is the Bronchitis, and not the Emphysema, which is the hereditary complaint; for we find, when we take the total number of persons concerned, including the patients themselves, their parents, and their brothers and sisters, that the percentage of asthmatics is nearly the same in the cases in which no Emphysema existed, as in those in which it was combined with the Bronchitis. And when we take the total number of parents concerned in each group, we find that the proportion of asthmatics is only about 17 per cent. in the cases of Emphysema; whereas, it is 25 per cent. in those of Bronchitis uncomplicated with Emphysema.

I am quite aware that it would require many hundreds of cases to afford statistics which would be perfectly reliable; but, so far as they go, these results are very interesting. They accord with what our clinical experience and our knowledge of the etiology of diseases lead us to except. We know that it is especially diathetic states which are apt to be hereditary; as for example, Gout, Rheumatism, Syphilis, Scrofula. (See Lect. VI.) And we know also how frequently these diatheses give a special tendency to Bronchitis and other catarrhal affections of the naso-pulmonary mucous membrane. It is, then, only what we ought to expect, that complaints which are especially apt to occur in hereditary diatheses should prove, on statistical enquiry, to run in families. (See Treatment of Diathesis, Lect. VII.)

You are aware that the commonly received opinion is, that Emphysema is the hereditary disease, and that it is so in a very marked degree. Thus, Dr. Fuller says:—
"Of 43 Emphysematous persons whom I examined, with

a view to this enquiry, 26, or, in other words, 60·4 per cent., acknowledged an hereditary taint." "A very similar result has been obtained by Dr. Jackson, jun., of Boston, U.S., who reports that no less than 18 out of 28 Emphysematous persons (or about 64 per cent.) had either a father or mother, or both, afflicted with Emphysema; whereas, 3 only out of 50 non-Emphysematous persons (or 6 per cent.) sprang from an Emphysematous stock." (Note to p. 296, "On Diseases of the Chest.")

There is room in both of these statements for grave error. We have no evidence as to how it was decided that the parents were Emphysematous; and, knowing as I do the difficulty of getting exact information as to the nature of the diseases from which parents and other relatives of patients have suffered, I have little doubt that the nearest approach to the truth which either Dr. Fuller or Dr. Jackson was able to attain was, that the parents suffered from *some form of chronic Asthma.* It would have been impossible to be nearer the mark than this by anything less than a careful physical examination of the parents themselves. Now the popular expressions "Asthma" and "Asthmatic" include chronic Bronchitis, cardiac Asthma, and spasmodic Asthma, as well as Emphysema. By careful enquiry, spasmodic and cardiac Asthma may, perhaps, be eliminated; but I am convinced, not only from my experience with patients, but from the examination (at the "Briton," "National Union," and "Great Britain" Life Offices) of many thousands of applicants for life assurance, who are very closely catechised on these points, that what is popularly called "Asthma" must be taken to include chronic Bronchitis quite as much as Emphysema.

These statistics, therefore, which we are *supposed to have in evidence of the hereditary nature of Emphysema,* must be taken with considerable caution. They must, at least, be made to apply as much to the hereditary transmission of a tendency to Bronchitis as to that of Emphysema.

In my own cases I have shown that the family history of Asthma was about the same in cases of chronic Bronchitis without Emphysema as in those with Emphysema, while the per centage of Asthmatic *parents* was much the largest in cases without Emphysema.

A careful consideration of all the evidence on the subject leads me to the opinion that there is a tendency in Bronchitis to be transmitted from parent to offspring, and to affect collaterals, and that this may be explained, as I have already suggested, by the fact that various diathetic states, known to be hereditary and to run in families, predispose to affections of the naso-pulmonary mucous membrane.

If, then, the tendency to Bronchitis and Catarrh is hereditary, and if Catarrh and Bronchitis are common causes of Emphysema, it is easy to see how naturally the mistake has arisen of concluding that Emphysema itself is hereditary.

LECTURE VI.

Natural Course of neglected Winter Cough, and its Interdependence with other Diseases.—See Table XXIII. p. 156.

A VERY important practical question will be frequently asked you by patients suffering from Winter Cough, a question which it will be your duty to answer with perfect candour, and with such caution and consideration that you may not be misunderstood; for issues of the greatest concern to your patients may hang upon your answer. The question is this—"What will be the consequence of neglecting my cough?"

I need not tell you that the answer to this very natural question will differ materially in different cases, and must depend upon a carefully balanced consideration of many points, of which the following are the principal:—

1. The age, sex and occupation of the patient.
2. The hereditary or acquired diathesis.
3. The clinical group to which the case belongs (see p. 3), viz., whether (*a*) it is a case of Emphysema, with a history of previous Bronchitis, but at the time of examination free from Bronchitis; or (*b*) a case of Bronchitis with no Emphysematous complication; or (*c*) a case in which both Emphysema and Bronchitis exist; or (*d*) one of those exceptional cases in which there is neither Bronchitis nor Emphysema. (See p. 88.)

4. Whether or not there is a great susceptibility to Catarrh, and which portion of the naso-pulmonary mucous membrane is most readily attacked, *i.e.*, whether the colds affect first the nose, the throat, or the chest; and whether a cold caught in one portion of the tract is accustomed to expend itself there, or to travel rapidly to some other portion, and which part is most subject to such secondary attacks.
5. What are the means and opportunities of the patient with regard to the extent and completeness with which necessary treatment can be carried out.

The fact is that many persons who have a Winter Cough have got sufficiently used to its discomforts, and suffer so small an amount of chest pain, that if they can be assured that no harm will come of allowing it to go on from year to year, they would rather leave it alone than undergo the trouble, restrictions, and expense, necessary to its cure; and I think we are bound, as medical men, to carefully consider the convenience and interests of patients in these respects before allowing them to commence a course of treatment.

This will be especially necessary with patients of limited means dependent upon their persistently following their occupations; that large class of persons who can neither afford to keep at home even in the worst seasons of the year, nor to indulge in changes of climate; and from the nature of their pursuits and disabilities, they naturally constitute the largest class of sufferers from all the effects of Naso-pulmonary Catarrh.

Let us then enumerate the ordinary course of Naso-pulmonary Catarrh when allowed to take its chance without

treatment either by medicine, regimen, or climate, in a person not specially influenced by hereditary predisposition.

1. For one or more years a great tendency to colds in the head after exposure to wet, cold or wind, and frequently without such exposure, from mere barometric changes in the atmosphere. The colds gradually becoming more tedious and difficult to remove, till at length one cold has hardly disappeared before it is reinforced by another. (See Tables III., IV., V., VI. and XVI.)
2. A gradual extension of the colds in the head down the throat, or a sudden tendency to attack the throat first instead of the nose. (See Table VI.)
3. A gradual extension of the colds in the head or throat down the larynx and trachea into the bronchial tubes; or a sudden tendency to attack the air tubes first instead of the throat or nose. (See Table VI.)
4. Supposing none of the attacks to have been very severe or protracted, these catarrhs in the nose, throat or chest clear off completely, so that when free from cold for some time, under fortunate circumstances and in fine, warm weather, the patient appears quite well, no short breath or cough remaining. See abstracts of cases in Lecture IV. (See Tables IV. and VII.)

It must also be observed that all the effects of the gradual progress described in headings 1, 2, 3, 4, may be produced at a blow by a single very severe and protracted catarrh.

5. From the frequent repetition of the above states,

or through some unfortunate circumstances having induced one or more attacks of unusual severity, some of the bronchial tubes become dilated (see Plate II. Fig. 3), the naso-pulmonary membrane becomes so much thickened that it does not recover its normal state in the intervals of attack, or even under the influence of summer weather; and thus the breath remains permanently short, and there is an habitual cough and expectoration. Both the short breath and cough in this stage are much improved during summer weather, but do not actually depart. (See Table VIII.) (See also pp. 124, 5.)

6. It is from this point that the more serious consequences of Winter Cough begin to date. The dilated tubes keep up an offensive and wasting expectoration. The thickened membrane, and consequently diminished calibre of the air tubes permanently obstruct the freedom of respiration; less complete and rapid changes occur in the residual air of the chest; the vascular circulation upon which the aëration of blood depends is impeded, and an abnormal tax is put upon the right heart in its duty of propelling the blood through the lungs. Thus retrograde venous congestion of all the organs in arrear of the right heart gradually increases, and the right heart itself hypertrophies to meet its increased work. (See pp. 108, 116, and Lect. VII.)
7. The obstructed expiratory tide keeps up a constant undue pressure backwards upon the air-cells, the elastic walls of which gradually yield to this,

and the capacity of the cells becomes abnormally enlarged. This is greatly aggravated by the frequently recurring attacks of cough, consequent upon the other conditions, and the cells become stretched beyond their power of recoil; that is to say, they become permanently Emphysematous. (See Lect. II.)

8. The attenuation and overstretching of the walls of the air-cells interfere with the free circulation of blood in their capillary vessels, and add another to the already existing interferences with blood aëration, and another to the already existing causes of hypertrophy of the right heart, and of retrograde venous congestion. (See Lect. VII.)

9. A condition now exists in which every day produces new mischief of the most serious character. The over-stretched, ill-nourished walls of the air-cells degenerate, and lose thereby still more of their power to resist the distending influence of the backward pressure of air; and becoming, as it were, rotten in their texture, they tear and break up under the shocks of the convulsive coughs common to this stage of the complaint. The permanently obstructed venous circulation, after deranging the action of the stomach, liver and kidneys, leads to diseases of these organs, culminating in dropsy. (See Lect. VII., VIII.)

Such is a fair sketch of the gradual progress of a neglected Winter Cough, due to Naso-pulmonary Catarrh. In its course many accidents may occur to which I have not alluded. As a matter of fact, a case seldom runs on

through all its stages without such accidents, and when they occur they precipitate all the evil consequences, or probably terminate the patient's life before the case has run through all its usual stages.

One of these accidental complications is so full of peril, and, unfortunately, so apt to occur, that I must stop to caution you against neglecting it. Every now and then an attack of Bronchial Catarrh will be accompanied by active congestion of portions of lung-tissue, and if the patient is predisposed to tuberculous disease, and happens at the time to be in depressed general health, there will be great danger of the occurrence of tuberculisation in the congested tissue; and I need not tell you that we are then brought face to face with all the dangers and difficulties of Consumption, in addition to those of the Winter Cough. (See Lect. IX.) But independent of a tuberculous diathesis, we must always regard these attacks of active congestion of portions of lung with great apprehension, and lose no time in dispersing them, for their repetition in the same part, or their accidental occurrence with unaccustomed severity, will lead to disintegration of the affected tissue, and although unaccompanied by any deposit of miliary tubercle, the patient's life will be placed in great jeopardy by a chronic wasting disease, having many of the characters of tubercular consumption. (See Lect. VII. and IX.) [1]

[1] "It is a tolerably well-known fact that many cases of phthisical destruction of the lungs start from a catarrhal affection of the respiratory mucous membrane, and particularly of those bronchi which ramify in the upper lobes. This catarrh is characterised partly by its singular obstinacy and tendency to recur, partly by the never-failing scrofulous enlargement of the retro-bronchial lymphatic glands (Virchow). The secretion is highly corpusculated, and therefore viscid and concentrated; hence, too, it adheres very

Space will not allow me to refer in this place to the less important accidents which may complicate a Winter Cough at different stages of its course.

The question we have to put before the patient is:—To what extent he is willing to take the chances of this long catalogue of ills; and the question he will wish us

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tenaciously to the walls of the respiratory passages; this occasions disproportionately frequent, though in the main unsuccessful, efforts at coughing and hawking. Dissection shows the large bronchi loaded with this secretion, while a certain number of the *smaller tubes* appear to be completely plugged by it. On examining transverse sections of the latter we find their walls permeated by a countless multitude of corpuscular elements, the boundary-line between connective tissue and epithelium obliterated, and the latter replaced by the above-mentioned thick layer of muco-purulent secretion. I have observed this condition in bronchi from 0·5 to 0·3 millimetres in diameter, and I connect it with the early disappearance of the basement membrane, which is of such extreme thinness in these bronchioles that its very existence is a matter of some doubt. In the trachea and larger bronchi the basement membrane acts as an important safeguard against the extension of catarrhal processes into the deeper tissues, just as the elastic networks, with which they are so abundantly provided, serve to resist the distention of the mucosa with inflammatory infiltrations. Both of these structural peculiarities gradually become less marked as we pass from the trunk of the respiratory tree to its branches; hence the narrower the bronchi, the more liable are they to become blocked by swelling of their lining membrane and by accumulated secretions as a result of simple catarrh." . . . .

"The expiratory act needed for the removal of the viscid and adherent secretion proves too great for the patient's powers; during the inspiratory act, moreover, owing to the ease with which a compensatory dilatation of the neighbouring portions of the lung may occur, no air forces its way past the viscid plug of mucus into the parenchyma behind it; the block becomes chronic, and ultimately permanent. The ulterior consequences of the more or less complete occlusion of the bronchi which has been thus produced may be traced in various directions."—"A Manual of Pathological Histology, by Dr. Eduard Rindfleisch," Vol. ii. par. 420. Sydenham Soc.

to answer is, To what extent are we able to prevent these ills, or to cure them when they occur?

At any stage after No. 5 you will find patients anxious enough for cure; their troubles and difficulties have become burdensome to them, and the joy of their lives is gone; they will then do everything that their means can command to get cured. But this is not the case in the previous stages, and it is less and less so as we get further and further back in the history. And this comes naturally enough through ignorance on the part of patients as to the probable effects of neglecting their cases in the early stages. You will find that it is only in proportion as they have made themselves acquainted, either by reading or enquiry, with the probable consequences of their complaint when left to itself, that they attach sufficient importance to it in its early stages to take such means as are necessary for its cure.

While, therefore, you should avoid any approach to unnecessarily alarming your patients, it will be your duty, as I said at first, to candidly inform them of the dangers with which the natural course of their complaint is beset when left without treatment.

We must not, however, forget the other side of the story. Notwithstanding the unpromising picture I have just drawn, cases occur, every now and then, in which I am accustomed to advise my patients to let their Winter Cough alone. For example:—

A patient tells you he has had a cough nearly every winter for five, ten, or twenty years, that it does not get worse from year to year, but, on the contrary, has never been anything like as bad as the first year of its occurrence —that the breath in summer is not observably short, and that the cough always disappears with the warm weather.

His health has not apparently suffered, and he has never staid at home on account of his cough. On examination, you find a small amount of chronic thickening of the naso-pulmonary mucous membrane, a small amount of bronchial secretion of a loose character, easily expectorated; no heart disease, no Emphysema; the cough does not seriously interrupt his sleep, and does not occur in violent convulsive fits; there is no great sensitiveness to colds, and no marked diathetic condition. You learn also that he is quite unable to leave his daily occupation and get change of climate, or even to stay at home in bad weather; that he has frequently had advice and medicines for his cough, but without material benefit, and expense is a serious consideration with him. Finally, you find that the cough dates from one severe neglected and protracted attack of naso-pulmonary catarrh, occurring in the midst of good health, and traceable to a great and unusual exposure—that, in fact, it was not due to any diathetic predisposition, but to an accident in the conditions of life, and that the damage to the naso-pulmonary mucous membrane is rather the vestige of that one attack than a gradually encroaching condition due to repeated attacks.

Under these circumstances, if you find, on careful enquiry, that the advice and treatment he had previously received were good, and such as ought to have benefited him if his complaint were easily amenable to the effects of medicine alone, you will do well to give the patient such instructions for dress and other precautions against fresh colds, as I shall give in detail in our next lecture; advise him to keep a careful watch as to any signs of either his cough or his breathing getting worse, and in that case to apply at once for treatment; and to take ad-

vantage of the first chance of a winter in a more suitable climate; but, pending these contingencies, not to spend either time or money on the treatment of his Winter Cough.

This advice is, of course, a compromise with the circumstances of your patient, and it would be much more satisfactory to send him at once for one winter to a warm climate, or to place him under a course of medicine and hygienic management at home, the effects of which would probably be to cure his complaint; but if the cost and sacrifice of such a course are, in his case, out of proportion to the importance of the results, you will, I think, be quite right in advising the sort of compromise I have suggested.

The same may be said in the case of a patient, similarly circumstanced to the last with regard to means and opportunities of treatment, who is found to have a certain amount of Emphysema, evidently dating from some one exceptional accident of life, and who has gone on for years without any marked increase in his symptoms, getting a not very distressing cough in winter and losing it in summer; suffering permanently from a moderate amount of short breath, but not getting worse in this respect, and not suffering either in his worldy affairs or in his health from his complaint. Such a person may be advised to keep a watch upon his disease, to take advice at the first sign of its getting worse, to take advantage of any chance of radical treatment, either by medicine or climate, and to adopt precautionary measures for the avoidance of fresh attacks like his first, or of conditions calculated to aggravate his complaint; but otherwise to let matters alone.

Other cases will occur to you of somewhat similar con-

ditions to those I have described, in which you may feel it kind and wise to advise abstinence from treatment. But I cannot say that it is at any time satisfactory to the physician to allow a patient to run the risks of leaving his complaints uncured. It is far better, if the question of means is the obstacle in our way, to obtain for our patients the advantages of some of those great benevolent and charitable institutions for which our country is distinguished, and thus to place within the reach of the poor and needy the same opportunities of medical curative treatment as are obtainable by the rich.

With regard to what promise we can make as to the effects of treatment (see p. 79), when it can be pursued properly and promptly, it is evident that, although the difficulties increase with every stage of the complaint, there is nothing out of the reach of radical cure, at least up to stage 6. And although from that point the possibilities of *complete* cure become less and less, there is no stage, even up to the last, that is not susceptible of beneficial treatment within certain gradually decreasing limits, —treatment that becomes of more and more vital importance as these limits get narrower and narrower ; and the particulars of which will form the subject of our succeeding lectures. (See Lect. VII., VIII., IX.)

Table XXIII.

The Interdependence of Winter Cough with other Diseases.

Diseases which act as causes of Naso-pulmonary Catarrh.	Diseases caused by Naso-pulmonary Catarrh.	Diseases and Conditions the fatality of which is increased by Winter Cough.	Effects of Winter Cough upon succeeding Generations.
Rheumatism { hereditary or acquired.	Bronchitis.	Typhus, Typhoid, Rheumatic, and other Fevers; Measles, Small Pox, Whooping Cough, and other Acute Diseases.	Hereditary pre-disposition to Catarrh, Bronchitis, Emphysema, Asthma.
Gout . . { hereditary or acquired.	Thickening of the walls of the air passages.	Pregnancy, Parturition, Lactation.	Consumption, Scrofula, and other forms of Constitutional Debility, due to the deteriorated health of Parents.
Syphilis . { hereditary or acquired.	Bronchiectesis (see Plate II., Fig. 3, dilated Tubes).	Hernia.	
Scrofula . { hereditary or acquired.	Emphysema (see Pl. II., Fig. 4).	Cerebral Diseases.	
Winter Cough, (Catarrh, Bronchitis, Emphysema, Asthma) { in ancestors.	Heart Diseases.	Heart diseases.	
Rickets.	Cerebral Diseases.	All Internal Congestions.	
Measles.	Stomach Affections (Dyspepsia).		
Influenza.	Liver Diseases.		
Whooping Cough.	Kidney Diseases.		
Heart Disease.	Dropsy.		
	To these may be added—Hernia, which is frequently a consequence of violent coughing.		
	Disintegration of Lung Tissue, or Catarrhal Consumption (see pp. 150-1.)		
	Tubercular Consumption. (see p. 150).		

LECTURE VII.

Treatment; objects of, discussed.—Dilated heart.—Collapsed lung —Emphysema.—Dr. Berkart's and Dr. Dobell's instruments for artificial expiration of residual air in Emphysema.—Thickened naso-pulmonary mucous membrane, with narrowing of the air-passages.—Catarrh of the naso-pulmonary mucous membrane. —Undue susceptibility of the mucous membrane.—Hereditary conditions favouring or producing such susceptibility.—Remedial measures.—Importance of Diathesis.

We now come to the all-important question of treatment. What are we to do when a case of Winter Cough comes before us in practice? All that I have told you, and attempted to make clear in the foregoing lectures, has had a definite connection in my mind with this question, and I shall have very much failed in carrying out my intentions if I have not put you in a favourable position to answer the question for yourselves.

Let us consider, then, what it is that we have to treat. First and most prominently thrust on our attention is the Winter Cough. That is clear enough, and it must, I think, be equally clear to us all that, if we direct our attacks upon the Cough, as though that were the disease, we shall make a fatal mistake, and shall most certainly be disappointed in our hopes of doing any permanent good.

What we have to treat, then, in the large majority of cases of Winter Cough is a combination of some or all of the conditions which I have already discussed, viz.:—

1. Dilated right heart.
2. Collapsed lung.
3. Emphysema.

4. Thickened naso-pulmonary mucous membrane, with narrowing of the air-passages.
5. Catarrh of the naso-pulmonary mucous membrane, of greater or less extent.
6. An undue susceptibility of the naso-pulmonary mucous tract.
7. Local and general conditions, favouring or producing susceptibility of the mucous membrane.
8. Cough and short breath; symptoms of the existence of the conditions already enumerated.
9. Dilated tubes (Plate II., Fig. 3).[1]
10. Disintegration of lung tissue (see p. 150 and Lect. IX.).[2]

1. Dilated right heart. This is a secondary affection, produced by the persistence or frequent repetition of obstructed pulmonary circulation. It is a complication so sure to occur in a protracted and neglected case, and, once established, it exercises so important an influence over its future course, that we ought never to forget the tendency to its occurrence. During the whole course of any case of Winter Cough which comes under our care, we must remember congestion of the right side of the heart as a thing to be continually guarded against. If no organic change has yet occurred in the organ, we have to remember this as a thing to be prevented; if the organ is already hypertrophied or dilated, or the tricuspid valve has already ceased to prevent regurgitation, we have to remember that all these con-

[1] In dilated tubes, the inhalation of vaporised carbolic acid is of especial service.

[2] In the treatment of chronic localised catarrhal disintegration, I have found a *seton* over the affected part a very potent remedy.

ditions will be aggravated or kept in check in proportion as we guard against congestion of the heart. (See p. 108.) We have to remember that congestion of the right heart is the common cause of Dropsy, and that this miserable complication of a Winter Cough will come and go as we permit or prevent stasis of the pulmonary circulation. And I need not remind you of the damaged liver, and the damaged kidneys which, in time, result from the neglect of retrograde venous congestion. (See pp. 149, 156.)

It would be impossible in this lecture to enter into the details of the treatment of dilated heart. Let me simply warn you, in passing, that in every case of Winter Cough danger signals must be placed upon the pulmonary circulation, the right heart, and the great veins.

2. Next on our list stands Collapsed Lung. In the course of a case of Bronchitis, Whooping Cough, or any other affection of the air passages, whenever a portion of lung is suddenly deprived of the power to be inflated, by the presence of a plug of secretion sucked into its main air passage, a set of symptoms is produced, the severity and importance of which will vary with the obstinacy with which the obstructing plug resists the attempts at its removal, and with the extent of lung-substance cut off from the pneumatic circulation. (See p. 150.)

Portions of lung are frequently being temporarily blocked off in this way during the fits of coughing which attend naso-pulmonary affections; but the plugs are so quickly removed and the admission of air restored, that, in the majority of instances, no damage remains. But every now and then it happens that the plug fails to be removed. It is just sufficiently dislodged by expiratory efforts to allow the air-cells behind it to be emptied, but

is borne back into its place on the front of the inspiratory tide, and fixed in the threshold of a portion of collapsed and useless lung tissue.

Under any circumstances, however small the portion of lung thus put in peril, whether the plug is eventually removed or not, a very distressing convulsive cough is set up, which, as I have already stated, may cause Emphysematous distension of the air-cells; and when an important branch of the bronchi is in question, and a large portion of lung-tissue at stake, unmistakeable and most alarming symptoms attend the accident. It is not my purpose, however, to treat here of these symptoms further than to remind you that, in this way, the occurrence of collapse of portions of lung may happen to constitute an important feature in a case of Winter Cough. But what we have to consider here is the existence of a portion of lung, thus damaged and useless, in its position as one of the possible accompaniments of a Winter Cough, and to what extent, if at all, it need influence our treatment.

Now, in this capacity it may soon be disposed of. First, you have to take care when making your physical examination that you do not mistake it for a portion of hepatized lung, and thus waste your own and your patient's time in treating it as such; and, in the next place, having made up your mind as to its nature and the probable length of time it has existed, there are two courses to be followed:—First, if it is at all recent, cautiously to endeavour by rational measures, which will be chiefly gymnastic, to restore it to a permeable condition; and, second, if it is clearly of old standing, to let it alone. So great is the power of the organism to compensate such damages, that considerable portions of lung can be deprived of function without producing more than temporary distress.

But what I wish particularly to impress with regard to the discovery of a portion of collapsed lung is this,—to bear clearly in mind the mode of its production, to remember that what has happened once may happen again to the same patient,—that every time these violent convulsive coughs are set up you run the chance of having a fresh set of air-cells deprived of their elasticity by the over-distension of their walls during the expiratory shock,—and that the cause of all this is the naso-pulmonary Catarrh by which the plug was produced that stopped up the tube. Of this Catarrh I shall speak hereafter.

3. Emphysema. I have shown you in former lectures that Emphysema may come either before or after the first history of Winter Cough, although in the large majority of instances it comes after the cough. I have shown that Emphysema, *per se*, cannot be considered as the cause of the cough, because the Emphysema may exist without the cough, and the cough may exist just as much without as with the Emphysema. The only way in which the Emphysema can be considered as a cause of cough is by its predisposing to affections by which the cough is produced. Practically it rarely happens that Emphysema exists for any length of time without some circumstances arising which bring on a cough.

I have shown you that when the commencement of Emphysema has preceded the commencement of Winter Cough, it may be—nearly always—attributed to one of the following causes:—

1. Violent expulsive acts.
2. Violent exertions of force in lifting or carrying weights.

3. Convulsive fits of Cough; as in Croup, Whooping-cough, Laryngitis, and the like; in which the cause of cough is a temporary one, the cough ceasing but the Emphysema remaining.
4. Violent fits of sneezing and of nose-blowing, under peculiar conditions of obstruction.

It is evident that, in the fourth of these sets of causes, the conditions likely to cause the sneezing[1] and the nose-blowing will usually be such that, if they continue for any length of time, they will become causes of cough; and thus the occurrence of Emphysema before the cough, instead of after it, is accidental.

With the first three sets of causes, it is evident that they may have ceased for any length of time after producing the Emphysema; and, except so far as the existence of Emphysema is concerned, they may have no possible influence over the after history of the case. A man may, for example, have overstrained his lungs by lifting too great a weight twenty years ago; or a child may have had Whooping-cough and over-stretched the air-cells during one of the paroxysms; and the man and the child may have remained Emphysematous ever since, although the Whooping-cough had long been completely cured, and the heavy weight had never again been lifted.

In these cases, the Emphysema may be considered as a disease *per se* as long as it remains uninfluenced by superadded diseases. It is well, then, for our present purpose of correctly estimating what it is we have to treat, that we first consider what are the essentials of this simple Emphysema.

In the first place, it consists of a portion of lung the

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[1] See Appendix III, Remedy for Sneezing.

air-cells of which have been *over-stretched;* and it is important to recollect what this over-stretching means when it exists in its smallest appreciable degree.

You know that in the healthy state the walls of the air-cells are elastic, and that it is the essential condition of perfect elasticity that a body shall, when stretched, have the power of recoiling to exactly the same position in which it was before the tension was applied to it. In proportion as it loses this capability it deviates from the standard of perfect elasticity. A perfectly elastic body will retain this property until it is so far stretched that it snaps; but most elastic bodies retain their elasticity within narrower limits, and lose the power of perfect recoil before they sufficiently lose cohesion to snap; and thus they may be stretched to some extent beyond the point at which they retain the power of perfect recoil. It is this which constitutes over-stretching of an elastic body; and the elastic air-cells of the lungs are susceptible of a certain amount of this over-stretching without rupture.

The elasticity of the lungs is so nicely calculated to meet the requirements of respiration, that, in the normal condition, after the fullest normal inspiration, the lungs recoil by elastic force alone to a condition of fullest normal expiration, and yet retain an elastic power competent to recoil still farther; so that when full ordinary or elastic expiration is supplemented by extraordinary or *muscular* expiration, the lung is still recoiling before the contracting chest-wall. Thus, in the natural state, *pressure of the chest-wall upon the superficies of the lung is unknown.*

Upon the perfection of this degree of elastic recoil everything depends.

The smallest appreciable degree of *over*stretching of the air-cells may be taken to be such as shall leave their power of recoil intact to the extent of full *ordinary* expiration, but deprive them of that which should still carry them on before the contracting chest-wall in extraordinary or *muscular* expiration.

But small and trifling as this amount of over-stretching and of impaired function may at first sight appear, it constitutes the first step in a most important series of changes, and for that reason must take rank as a very serious disease.

It is true that, when the loss of perfect elasticity is thus limited, there is nothing in it which need at all interfere with *ordinary* respiration. The lung can expand when the chest-walls are expanded by inspiration, and recoil before them when they recoil. But all the normal calculations are deranged when any cause arises which requires *muscular* expiration to be put into force. Then, at once, a totally abnormal condition is discovered, in which the chest-wall has to exert pressure upon air-cells full of air, and to drive the air hither or thither, according to the amount of muscular force exerted on different portions of the lung-surface.

In addition to this, an elastic body, which has been so far damaged as to have lost the power of complete recoil, must have lost something of the stability of the *whole* of its elastic power; and thus is rendered more susceptible to further damage, through loss of resistance to an amount of tension which, before, it would have been competent to withstand.

In illustration of such changes as I have described, I may refer to cases such as those already cited, in which persons received many years ago some over-stretching of

the air-cells, as in the shock of an attack of Whooping-Cough in childhood, but suffered no material interference with respiratory power until some superadded affection placed an obstruction in the way of the expiratory tide, and thus taxed the elastic power of the air-cells, and called for forced muscular expiration; or until some change in the occupation of the person called for forcible expiratory acts performed with a closed glottis.

But in an advanced state of Emphysema the walls of the air-cells are found attenuated, their capillaries ruptured and obliterated, and their partitions broken through, so that several cells are thrown into one (See Plate II., Fig. 4). Those bronchial tubes, which run among the distended and crowded cells, are subjected to undue pressure from without and to diminution of their calibre, when muscular expiration is brought to bear upon the Emphysematous lung by which they are surrounded. (See p. 14.)

Turning back, then, to the question with which I started—the question of treating this Emphysematous state of lung *independently as a disease per se*—everything turns upon the elastic property of the air-cells, and whether or not it can be restored when lost even in the smallest degree. Now we must remember on what the loss of elasticity depends. If it were upon damaged muscular tissue, either organic or inorganic, we should be able at once to turn to certain remedies and hygienic measures known to be capable of restoring lost function to muscular tissue and of increasing its contractile powers. If it were simply dependent upon elastic fibres snapped in two, we might hope, by the reunion of the snapped fibres, to restore the lost elasticity. But, unfortunately, the condition with which we have to deal consists of

elastic fibres over-stretched, and thus, by some change in the relation of their molecules, deprived of their essential physical property; and we have no positive knowledge of any remedy competent to effect the rearrangement of the molecules, and thus to bring back the normal function.

It seems then a very hopeless case; and all that we know clinically of the progress of elastic tissues, which have been over-stretched, does not do much to reassure us. And yet there is some hope to be gathered from this source. We have in the skin, the most familiar and easily observed specimen of a mixed fibrous and elastic tissue, a tissue the elasticity of which depends upon the interweaving of elastic fibres with other materials, as in the air-cells; and from observation of what happens in the skin we may gather both discouragement and hope. We know how beautifully the skin recoils after tension under normal circumstances; how it accommodates itself to a stretched condition under some circumstances; and how, under others, as when tumours have disappeared over which it has been extended, it recoils and obliterates the trace of the previous distortion. But we also know how very slow it is to recover itself if it has been over-stretched beyond a certain point, and especially if that over-stretching has been of long continuance or often repeated, as in the pendulous folds which so long disfigure those who, having been fat for years, have become thin.

But still we know that, even in such cases, though the change may be slow, yet under favourable circumstances, especially under the influence of vigorous healthy assimilation, time will do much to restore the normal elasticity to the skin. By analogy we might well hope for such

changes in the over-stretched elastic tissue of the air-cells. And theoretically it would appear that, if healthy assimilation could be kept up, the cause of the damage not repeated, and sufficient time granted, a healthy molecular condition might be restored to the damaged elastic tissue.

But how shall we secure "healthy assimilation" in a tissue withdrawn from the influence of volition, and deprived, by the very change we wish to remedy, of the exercise of its involuntary mechanical function? Are not these the essential conditions of degeneration rather than of healthy nutrition? Again, how shall we prevent the "repetition of the cause of damage" in a part whose damaged condition is itself the excitor of new sources of injury? And, lastly, is not the "grant of sufficient time"—so precious when the other conditions are fulfilled—only an opportunity for degradation of tissue when they are withheld?

If, then, the restoration of over-stretched air-cells to their normal properties and functions is such an unpromising task when the morbid change is once firmly and long established, let us consider whether we have any means of staying the progress of Emphysema when it first begins, or of depriving it of any of its evils when it is further advanced.

My friend Dr. Berkart recently described (*Lancet*, Nov. 25th, 1871) an instrument which he had invented for the purpose of better effecting the objects aimed at by the experiments of Drs. Hank, Hagel and Mader, of Vienna, in the treatment of Emphysema of the lungs. The objects of these experiments and of Dr. Berkart's instrument were, "to reduce the intravesicular pressure and that resulting from it on the thoracic surface of the diaphragm,"

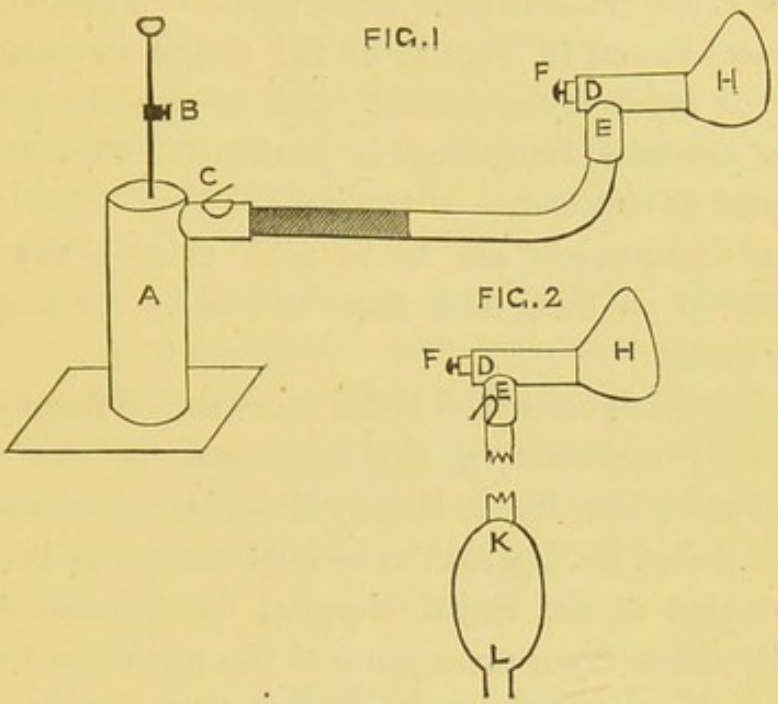
and to displace and replace the residual air stagnated in the Emphysematous cells.

Dr. Berkart says, "With a somewhat bulky instrument, a modified Hutchinson's spirometer, which, if safety is to be ensured, has to be worked by two assistants, Dr. Hank first used compressed air in croup and Emphysema. Subsequently he found that if Emphysematous patients were allowed to expire into an atmosphere, the pressure of which was from four to eight inches of water less than that of the air, the relief they obtained was greater and more lasting than by the use of compressed air; and his brilliant results have been fully corroborated by Drs. Hagel and Mader. I therefore designed two instruments, and I have been using them for some time with the best results."

Dr. Berkart's Instrument for Artificial Expiration.

Fig. 1: A is an exhausting syringe, the piston-rod of which is divided to represent cubic centimetres, so that by means of the adjusting stud, B, the amount of action of the piston may be measured and regulated. The piston-rod is always raised by means of a helical spring fixed in the upper part of the cylinder, and exhaustion is produced by depressing it with the hand. The capacity of this syringe is known. H is a mask of metal, shaped so as to be readily adapted to the face, and enclosing both mouth and nose. The juncture of the edge of the mask and the face is effected by a cushion of india-rubber, which effectually prevents the escape or admission of air. It is attached to the face by a band round the head, or is held by the hand. Proceeding from the mask is the chamber, D,

and the tube, E. At the point D, within the chamber, is an inspiratory valve, and at the point E an expiratory one. C is also an expiratory valve. F is an inspiratory valve,



under command of the finger of one hand. The mask and syringe are united by about eighteen inches of stout tubing.

Fig. 2 represents the mask and valve detached from the syringe. The expiratory valve, C, in Fig. 1, is placed at E, in Fig. 2. The necessary exhaustion is produced by an india-rubber ovoid, K, L, holding about 15 cubic inches, and is compressed one or more times at the end of each expiration. The mask, H, Fig. 1, is carefully fitted, and attached firmly to the face. On inspiration taking place air enters at F and D; upon expiring the valve D closes, while E and and C open. The last feeble flutter of the valve, C, indicates the end of expiration; then the spring

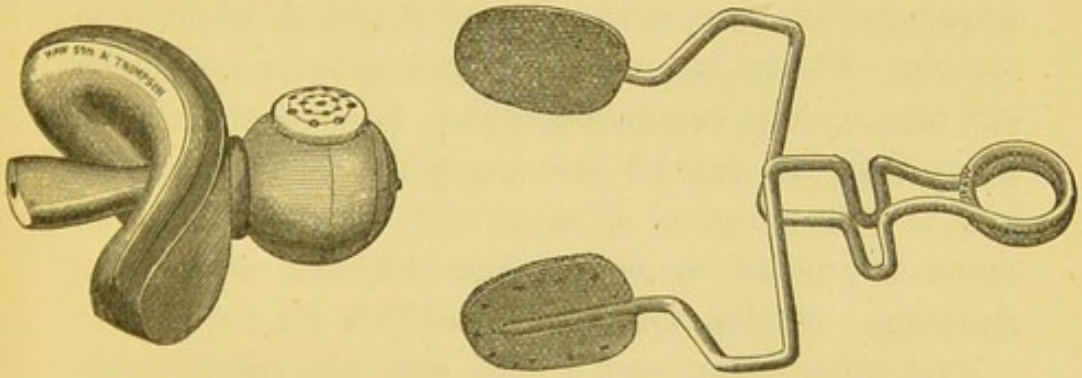
valve, F, is closed with the finger, and the piston depressed the required amount, producing a further expiration. On removing the hand from the piston-rod, it rises as shown in the woodcut; and upon releasing the valve F, inspiration again takes place. In using the instrument shown in Fig. 2, at the end of expiration the ovoid is rapidly compressed, and as rapidly released, when artificial expiration is produced. This may be repeated as required.

The instruments are to be used twice a day for a quarter of an hour each time, and to be continued for some weeks.

Being much interested in the treatment of Emphysema, and fully appreciating the importance of the objects aimed at by Drs. Hank, Hagel, Mader, and Berkart, I at once induced Dr. Berkart to be kind enough to bring his instrument to the Royal Hospital for Diseases of the Chest, and to try it upon some of the numerous Emphysematous patients who seek relief at that charity. By a set of inspiratory and expiratory valves communicating between an orinasal mask and an air-pump, the cylinder of which is suddenly exhausted at the instant when the patient completes an act of ordinary expiration, Dr. Berkart aims at removing from the chest a certain volume more of air than would be evacuated by the patient's unaided expiratory powers. (See p. 168.) When every precaution is taken to adjust the mask hermetically to the face, to stop the inspiratory valve and to exhaust the receiver at the exact moment when ordinary expiration ceases, and to keep the patient from holding his breath at that instant, the instrument answers its purpose very well. But it is obvious that the exact adjustment of all these points is difficult and troublesome; the instrument is cumbrous and expen-

sive ;[1] and although Dr. Berkart thinks that its use "for a quarter of an hour twice a day" will be sufficient, I do not myself expect that good would be effected without a very much more frequent repetition of the operation. It has appeared to me, therefore, that if good is to be done by exhausting the chests of Emphysematous patients, it is a great object to place in their hands a simple, portable, inexpensive instrument, with which they can carry out the treatment, easily and frequently, in the absence of the medical man.

With this view, I submit the accompanying drawings of a little instrument which I have contrived, and which has been nicely made by Messrs. Maw, of Aldersgate Street. I believe it completely answers the end in view, viz., to pump out the residual air of the lungs, so far as that is possible, and I have, therefore, named it "A Residual-Air-Pump."



Dr. Dobell's Residual-Air-Pump for Emphysema, with Respirator-shaped Plug or the sides of the Mouth and Clip for the Nostrils.

My opinion, supported by such experience as I have yet had, is that by these means some assistance may

[1] I have seen great inconvenience from temporary deafness produced by the suction of this instrument upon the Eustachian tubes.

be afforded to even chronic and aggravated cases; and that in recent cases, where the cells are over-distended but not yet deprived of their elastic properties, permanent curative effects may be expected from the *frequently repeated use* of such mechanical assistance as these instruments afford, combined with treatment for the removal of the causes of the over-distension of the cells.[1]

To use my instrument, it is only necessary to put the pipe-end into the mouth, and to inspire and expire entirely through it, avoiding inspiring through the nostrils or sides of the mouth. This is easily done; but, to make it more secure, a little compressing clip for the nostrils, and a respirator-shaped plug for the sides of the mouth, are provided.[2] The instrument has but one valve, which is so constructed as to answer all purposes. It allows the freest possible *ex*piration, but restricts *in*spiration to such an extent that, in from three to six respiratory acts, the expiratory and reserve air are quite pumped out, and the diaphragm has risen to the greatest height of which it is capable. The patient is then obliged to open the mouth and take a deep inspiration, which he does much more freely than he could before using the instrument, and with a distinct sense of relief and comfort. He then closes his mouth upon the pipe-end, and repeats the operation.—(*British Medical Journal*, Feb. 10, 1872.)

I am quite certain that I have seen air cells, temporarily over-distended under peculiar morbid conditions, regain their normal state when those conditions were

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[1] This opinion, expressed in 1872, has been confirmed by subsequent experience.

[2] I find that most patients soon learn to do without the nose-clip.

removed; and I have often seen cases of confirmed Emphysema, which had long been accompanied by the most distressing and ominous symptoms, deprived of all their serious import by the removal of thickening of the naso-pulmonary mucous membrane, although no remedial change had occurred in the Emphysematous condition itself.

This brings me to the fourth on the list of "conditions, with some of all of which we have to deal in the majority of cases of Winter Cough," viz., thickened naso-pulmonary mucous membrane, and narrowing of the passage which it lines.

I have already shown you that this is the most important of the causes of Emphysema. I have shown that this condition plays the principal part in causing variations in the degree and persistency of the short breathing, whether the Winter Cough is accompanied by Emphysema or not. I have shown that when Emphysema exists in a slight degree, it may be pushed on to any extent by continued obstruction to the expiratory tide by narrowed air-tubes, and that its progress may be stayed by removing the obstruction. I have shown you how the Winter Cough itself is dependent, in the majority of instances, upon the condition of the naso-pulmonary mucous membrane. And I have shown the way in which this thickening of the mucous membrane and narrowing of the air passages, takes place. We have seen how various are the causes, both within and without the body, by which flushing of the mucous membrane may be excited (Lect. II.) I have shown you that this flushing may be a very transient condition, or may run on into the production of serious and permanent changes in the chest.

The cases which I have laid before you illustrate all the stages of Catarrh of the naso-pulmonary tract, from a mere cold in the head to a severe and abiding disease of the whole bronchial tree. They show the way—the insidious way—in which Catarrh steals its marches on its victims; how simple in character and short in duration the first attacks may be; how they dispose the mucous membrane to fresh attacks; and how apt each attack is to involve a larger extent of surface than its predecessor; how often it happens that, when once the complaint has reached the finer ramifications of the bronchi, it lurks there still—even when the larger tubes have been restored to temporary health—every fresh attack of Catarrh in the larger passages supplying the lurking enemy with reinforcements, and enabling it to advance from its fastnesses,and to encroach further and further upon the respiratory tract, until at last it needs but a breath of wind upon the lining of the nose or fauces to raise a storm of rebellion throughout the length and breadth of the naso-pulmonary mucous membrane. Thus have we seen how very much that is connected with Winter Cough, in a practical sense, centres itself in Catarrh. (See Lect. VI.)

It is to this point, therefore, that I wish to devote most of the time we have left for the consideration of treatment—the treatment of Catarrh, and of those changes in the mucous membrane and in the calibre of the tubes which result from Catarrh.

If we could nip every Catarrh in the bud what a catalogue of ills we should prevent! And yet this is not such a very difficult thing to do when we have a chance of trying it. But unfortunately colds are thought so lightly of by patients that they seldom try to stop them till they

have became severe, have lasted an unusual time, or have produced some complication. Nevertheless I believe they would do better in this respect if they had more faith in the possibility of stopping colds; if their doctors would impress upon them more the importance of stopping them; and especially if they knew that *colds can be stopped without lying in bed, staying at home, or in any way interfering with business.*

I shall therefore occupy your time for one minute to tell you my plan of stopping a cold. The plan will not answer if the cold has became thoroughly established; it must be begun directly the first signs of Catarrh show themselves in the nose, eyes, throat, or chest,—in fact, before any considerable amount of secretion has taken place. If employed at this stage it is almost infallible. The plan is as follows :—

1. Give five grains of ses-carb. of ammonia, and five minims of liquor of morphia in an ounce of almond emulsion every three hours. 2. At night give ℥iss. of liq. of acetate of ammonia in a tumbler of cold water, after the patient has got into bed and been covered up with several extra blankets; cold water to be drunk freely during the night should the patient be thirsty. 3. In the morning the extra blankets should be removed, so as to allow the skin to cool down before getting up. 4. Let him get up as usual, and take his usual diet, but continue the ammonia and morphia mixture every four hours. 5. At bed time the second night give a compound colocynth pill. No more than twelve doses of the mixture from first to last need be taken as a rule; but should the Catarrh seem disposed to come back after leaving off the medicine for a day, another six doses may be taken and another pill. During the treatment the patient should live a little

better than usual, and on leaving it off should take an extra glass of wine for a day or two.[1]

As everything depends upon the promptitude of the treatment, persons who are subject to Catarrh, especially if it inclines to the influenza character, should be provided with a prescription for the medicine, and full instructions how to manage themselves *when a cold sets in.* Many old Catarrhal patients of mine, who have been accustomed for several years to stop their colds in this way, have given their medicine the somewhat unprofessional title of the "magic mixture," and would not be without it for the world, so often has it saved them from their old enemy. That then is, in my opinion, the best and simplest way of *stopping a cold.* It, in fact, leads to its cure, by "resolution." An addition to this plan is needed in persons whose colds seize at once upon the bronchial mucous membrane. Besides the plan of proceeding I have described, they should put ten grains of extract of conium, ʒi. of tincture of benzoin, and ʒss. of sal volatile into a pint of hot water, temperature 170°, and inhale the steam for fifteen minutes at bed-time each night; put a mustard poultice on the front of the chest one night, and between the shoulders the next; and unless the weather is warm, should wear a respirator out of doors till all signs of the cold have quite passed off.

By these simple means, promptly adopted, an attack of Catarrh may generally be stopped, and thus all the troublesome and serious effects prevented which follow an established and protracted cold. (See Lect. VI.) I would

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[1] When slight nasal catarrh threatens, it may be stopped by the Post-nasal Catarrh Lozenges. See Treatment of Post-nasal Catarrh.

particularly point out, that in Epidemic Catarrh or Influenza I have followed this plan of treatment, and it has proved most successful.

If these timely steps have been neglected, and a catarrh in the naso-pulmonary tract has become fairly established, a different plan of treatment is of course required, which must differ according to the severity of the attack and the part of the mucous membrane principally effected. It may then of course become necessary to confine the patient to the house, to his room, or to his bed, and may involve all the treatment usual for acute Bronchitis, with which you are so well acquainted. With this I will not occupy your time, therefore, further than to impress the great importance of completely curing each attack—of leaving no vestiges behind; we must only be satisfied when, by all methods of testing the respiratory powers, we cannot detect a lingering trace of disease in the naso-pulmonary mucous membrane. (See Lect. VI.)

But there is a form of Catarrh, common—I might almost say universal—among the children of the poor, of which we have very little chance of seeing the beginning, although we too often see the end. It begins so early in their little lives that they seem as though they were born to it, and it goes on summer and winter from year to year. It is, of all forms of Catarrh, that which most certainly leads to thickening of the naso-pulmonary mucous membrane and narrowing of the air-tubes. It begins in carelessness and folly, and continues through carelessness and folly. The children are not half-clothed from their tenderest years; the little money at the disposal of the parents is wasted on a few fine clothes, instead of being spent on a sufficient covering of wool next the skin. It is quite sad to see the children brought to this Hospital—

martyrs to Catarrh—with tawdry feathers and smart ribbons, but not a scrap of flannel on their wretched little bodies. Besides these defects in dress, they are subject to be taken by their mothers from close, smoky rooms into the cold air, and to be exposed at the corners of draughty streets while their mothers are gossipping late into the evening. While these conditions remain, no medical treatment can be of any avail; and there can be no doubt that it is from this source that a very large number of the cases of narrowed air-passages, chronic Bronchitis, and Emphysema, are supplied to Hospitals.

We come, then, to the important question, What plan of treatment is to be pursued in cases of confirmed thickening of the naso-pulmonary mucous membrane, with narrowing of the air passages?

The number of such cases presented at this Hospital is enormous, and I have no hesitation in saying that they are quite susceptible of successful treatment, although the difficulties in the way are often very great. In private practice it is much easier to cure these cases, because proper treatment can be more satisfactorily carried out.

I have already explained that in this state the mucous membrane is remarkably susceptible to fresh attacks of Catarrh, by each of which its morbid condition is aggravated. The first point in treatment, then, is to provide against such attacks. It is, indeed, the fact that the membrane will, in course of time—a long time, certainly—spontaneously recover its normal condition, if it can be *absolutely* protected from the recurrence of Catarrh. It is in this way that quite wonderful recoveries have been made by fortunate changes in climate. I use the word *fortunate* advisedly, because even the best-selected change is sometimes most unfortunate, in consequence of

those vagaries in the seasons to which all climates are subject. (See Lect. IX.)

But even if we could always select an appropriate climate, and secure that it should not be fickle, it is not every one who can obtain change of climate, and scarcely any one who can do so just at the time it is needed. (See Lect. VI.) Unless then we are to confine our beneficial treatment to a very small number of favoured persons, we must find some substitute for change of climate; and this brings me to the question of the *use of respirators*. (See Lect. VIII.)

But first let me not omit to speak of that very important class of influences which I placed seventh on our list of the things we have to treat—those "general conditions, favouring or producing morbid susceptibility of the mucous membrane of the air-passages."

When treating of the hereditary transmission of a tendency to naso-pulmonary Catarrh (Lect. V.), I pointed out that this was due to the hereditary nature of certain diathetic states; and when treating in detail of the properties of mucous membranes, and the various modes in which they are affected, I pointed out that flushing, congestion, irritation, increased secretion, and all the phenomena of Catarrh, may be brought about by the presence in the blood of such impurities as proceed from mal-assimilation, imperfect digestion, rheumatic, gouty, syphilitic, typhoid, rubeoloid, and other poisons; and I pointed out the analogy in this respect between affections of mucous membranes and affections of the skin. (See Lect. II.) I need not, therefore, go over this ground again; but it is in relation to treatment that these facts assume the greatest importance. We may as well expect to cure a skin-disease dependent upon mal-assimilation by external applications

alone, to cure an attack of gout by poulticing the great toe, or to remove a syphilitic affection of the eye by the application of simple lotions, as to effectually treat an affection of the naso-pulmonary mucous membrane, dependent upon similar general causes, by remedies directed only to the catarrhal condition of the membrane. We may, indeed, in one case and in the other, produce temporary local amendment by such local and narrow-minded treatment;[1] but we know that the local disease will recur again and again so long as we neglect the general condition. When I say, then, that the first thing in treatment is to provide against fresh attacks of Catarrh, I must place first on the list of means of such prevention, the treatment of whatever general conditions we can discover, which, acting from within, may favour or produce morbid susceptibility of the mucous membrane of the air-passages.

Everything that we learn from physiology and pathology, all that we know of etiology, confirmed by our deepest clinical experience, conspires to hold up *the treatment of diathesis as the secret of therapeutic success.*

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[1] See Chap. I. of my work "On Diet and Regimen in Sickness and Health, and on the Interdependence and Prevention of Diseases, and the diminution of their fatality," &c. (5th Edition.)

LECTURE VIII.

Treatment continued.—Causes of Colds, Coughs, and Short Breath. Sudden changes of temperature.—Fog and damp air.—Draughts of cold air.—Cold winds.—Getting wet.—Wet feet.—Remedial measures.—Hygienic precautions.—Respirators.—Objections to a "shutting-up system."—Medicines introduced into the Stomach.—Medicines introduced into the air-tubes by inhalation, etc.—Counter-irritation.—Means of allaying the severity of the Cough in Bronchitis.—Post-nasal Catarrh.

HAVING then attended to the diathesis, let us proceed to protect the air passages from causes of irritation acting from without.

What these causes are we have already learnt from the analysis of the cases which I have reported.

Fresh colds were the only causes which brought on or aggravated the cough in 72 per cent. of the cases, and the most frequent and potent causes of these "fresh colds," as stated by the patients themselves, were—

1. Sudden changes of temperature in 21 per cent.
2. Fogs and damp air in 19 per cent.
3. Draughts of cold air in 16 per cent.
4. Cold winds in 10 per cent.
5. Getting wet in 14 per cent.
6. Wet feet in 17 per cent.

And we find this same list of causes of fresh colds as the potent provokers of short breathing. This important list is no less striking for the powers for evil which it is shown to possess, than for the remarkable simplicity of the evil powers themselves.

If then these unfortunate sufferers from Winter Cough could have been protected from sudden changes of tem-

perature, fogs, mists, cold winds, draughts, wet feet and wet coats and dresses, 72 per cent. would have been kept free from their coughs. (See Lect. IX.)

It would indeed seem strange if we could not find means of protection against such common-place influences. In truth there is no deficiency of means of protection against them; and it is because of the very common-place character of these means and of the influences themselves, that both are so much neglected and undervalued.

But 72 per cent. of the cases of Winter Cough, which I have analysed, might probably have been prevented by attention to these common-place things. Let us then give a few minutes to their consideration.

1. Sudden changes of temperature.

This is the most difficult to avoid of any on the list. The occupations and amusements of all classes involve such changes, and we cannot stop these occupations and amusements, even were it desirable to do so. The work-shop, the counting-house, the committee-room, the opera-house, the ball-room, must be warm when the outer air is cold, and changes from one to the other cannot be avoided. But very much could be done to prevent the body from feeling these changes. The first and most important is the complete envelopment of the body and limbs in wool next the skin, thus interposing a bad conductor of heat between the surface of the body and the outer air. It is surprising that even in the present day this simple and common-sense protection is neglected by so large a number of persons both of the educated and of the uneducated classes. It is not sufficient for the purpose in view that a little body-vest should be worn just big enough to cover the thorax and abdomen, leaving all the extremities unprotected. It should be insisted upon by medical men that the arms and legs require to be protected from

sudden transitions of temperature as well as the trunk. In fashionable life the greatest practical difficulty we have to encounter is the question of exposing the necks and shoulders of ladies in evening dress. It is useless to order body-clothing of wool to the throat and to expect that ladies will give up a fashion which has been followed and thought charming in all countries and all ages. The difficulty is however to be got over pretty well. Every lady in evening dress should carry with her, as invariably as she does her pocket handkerchief, a Shetland shawl or a mantilla of wool or fur, of a size and shape to cover all those parts not protected by woollen underclothing, and it should only be removed while actually within warm rooms, and should be kept at hand to replace on passing through passages, or if the rooms become cold, or if sitting in draughts.

The main source of protection, then, against sudden changes of temperature to the surface of the body, is to be found in a complete covering of wool next the skin. But besides this, a much greater attention than is common should be paid to putting on and taking off complete and efficient *over*-clothing, on going from hot to cold and from cold to hot temperatures. This is particularly neglected by the working classes, and by girls and boys at schools. In fact, schoolmistresses and schoolmasters appear to be peculiarly neglectful and peculiarly ignorant of the grave importance of these matters, as they are of so many others which not less vitally concern the physical welfare of those under their charge.

But when we have adopted all available precautions for avoiding transitions of temperature to the surface of the body, we shall entirely fail in our object of preventing catarrh, unless we also protect the naso-pulmonary mucous membrane itself. But of this I shall speak again by and bye.

What I have said with regard to sudden changes of temperature will apply equally to two other causes of fresh cold upon our lists, viz., draughts of cold air, and cold winds. Both are to be deprived of their sting by proper clothing of the skin and mucous orifices.

Getting wet, and wet feet, occupy a very serious place in our list, and there is no doubt that damp and cold applied to the general surface is the most efficient means of producing chill and vital depression, with congestion of the internal organs. It is necessary that cold be combined with moisture to produce this effect. Even if all the clothes on the body are wet, no harm will come so long as they are kept warm, and this suggests the very great value, to all persons liable to exposure to wet, of light waterproof overalls. They may either be put on to keep the under-clothing dry, or, if the under-clothing has become wet either by weather or by perspiration, they may be put on to prevent too rapid evaporation and consequent reduction of temperature, especially when the person is about to remain still after getting warm with exercise. In this variable climate, therefore, school-girls, governesses, shop and factory-girls, and all women whose occupations call upon them to brave the weather, ought to carry with them complete waterproof mantles, made as light as possible but extending from the neck to the ankles, which can be put on or not as required; and boys and men, similarly exposed, should carry waterproof overalls.

These are things easily obtainable in the present day and within the reach of all classes; so that it only requires that their importance should be sufficiently impressed upon those who need them.

But if wet and cold to the surface of the body is a

fruitful source of catarrh, wet feet—which means wet and cold feet—is a still more prolific source. There is no external influence which so surely produces congestion of the naso-pulmonary mucous membrane as wet and cold to the soles of the feet. There is nothing so universally neglected, and yet there is nothing more easy to avoid. Warm socks, horsehair soles, goloshes, provide efficient protection against wet and cold feet. It does not seem to be half enough understood that, although a shoe or boot may not be wet through, if the sole is damp it will by evaporation most effectually conduct away the heat from the sole of the foot, and therefore ought never to be worn after exercise is over.

I should hardly have ventured to occupy so much of the time of a medical audience with these apparently simple and common-place suggestions, were it not that they are so common-place that their importance is apt to be overlooked.

We have still one item left on our list—viz., Fogs and Damp Air, which were the things most inclined to make the breath short in 24 per cent. of the cases, and the most potent causes of fresh colds in 19 per cent. I have particularly remarked, that although the smoke and other irritating matters constituting fog are unquestionably very injurious, it is the *moisture and cold* of the fog which are the qualities most potent for mischief to the naso-pulmonary mucous tract. (See p. 134). There is but one means of depriving a fog or mist of its injurious properties, and that is a respirator; and the same may be said of the changes of temperature, of which I spoke just now; a respirator is the only means of protecting the respiratory passages from the effects of transitions of temperature. It would be difficult to over-estimate the value of efficient

respirators in this climate, as a means of protection against naso-pulmonary catarrhs, if persons disposed to these affections would only carry respirators about with them in their pockets, ready to put on if required at a moment's notice.[1]

I believe that any kind of respirator is better than none; but after experimenting with every kind that has been brought out of late years, I am quite convinced that there is none at all equal to Mr. Jeffrey's metal-wire respirator, or, as he now calls it, "pneumoclime." The "himalene," which he introduced, was also a most excellent instrument; but I object to it on account of the warm scarf in which it is concealed. Although it is quite proper to cover the neck lightly, I am decidedly of opinion that *warm wrappers* round the neck are objectionable; they produce congestion of the nasal and faucial mucous membrane, and thus dispose to the very complaints they are supposed to prevent.

But before leaving this subject of sudden changes of temperature, I must not forget to speak of sleeping-rooms. It is quite astonishing what follies are committed with regard to the temperature of sleeping-rooms. On what possible grounds people justify the sudden transition from a hot sitting-room to a wretchedly cold bedroom, which may not have had a fire in it for weeks or months, it is impossible to say; but it is quite certain that the absurd neglect of proper warming in bedrooms is a fruitful source of all forms of catarrh. We cannot too much impress

[1] The popular belief that breathing through the nose with the mouth shut is as efficient a means of warming and drying the inspired air as wearing a respirator is a delusion. And when a respirator is worn, inspiration should be performed *entirely through* it.

this upon our patients. It may often be almost as necessary for a delicate person to put on a respirator on going up to bed as when going out of doors, unless proper precautions are taken to assimilate the temperature of the sleeping-room with that of the sitting-room.[1]

Such then are the principal means by which I would attempt to defeat the fickleness of climate, and to prevent the recurrence of those attacks of catarrh which keep up and aggravate the disease of the mucous membrane. And you will probably have observed that they all assume that the patient suffering from Winter Cough *is to lead an active and an out-of-door life*—not to be confined to his bedroom, or his sitting-room, or even to his house.

This is a point in the treatment which I consider of very great importance.

Shut up your patient month after month, and perhaps winter after winter, in warm rooms, with little exercise, and you need not be surprised if you add fatty degeneration to his Emphysematous air-cells; fatty degeneration to his heart, the muscular strength of which is so important in keeping up his pulmonary circulation; biliary congestion to his liver, already disposed to be overcharged with blood; fat to his omentum, to impede the free action of his diaphragm—so essential to his easy respiration; fat to his diaphragm itself; dyspepsia to his digestive organs, the vigour of which is so important in keeping up healthy nutrition in his tissues;—in fact, if you adopt the "shutting-up system," you need not be surprised if, after a dreary hypochondriacal life, your patient should become prematurely old, and die of apoplexy, paralysis, or dropsy.

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[1] See "On Diet and Regimen," &c., 5th Edition, Chap. II., *op. cit.*

But when we have taken all these precautions—when we have taught the patient how to stop fresh colds (see Lect. VII., p. 175); when we have altered those general conditions of his system which predispose to his complaint; and provided him with the means of avoiding the recurrence of Catarrh;—there is still much left for us to do, and which we can do successfully, to promote the recovery of a normal condition in the naso-pulmonary mucous membrane.

The principal agents in such treatment are:—

1. Medicines introduced into the stomach.
2. Medicines introduced into the air-tubes by inhalation.
3. Counter-irritation.
4. Change of climate. (See Lect. IX.)

I do not believe in the possibility of adapting the exact details of treatment to particular cases, without taking into consideration and carefully balancing all the circumstances of each case to an extent which it is impossible to do in lectures and books, or in any other way if the patient is not before us. *I will not pretend therefore to direct the exact cases in which this or that remedy or combination of remedies is to be used.* To do this is in my opinion very much like the folly sometimes perpetrated by Governments, of issuing from their offices at home orders for the exact mode in which their generals abroad shall conduct their battles. It has always ended in defeat.[1]

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[1] This was published in 1866. The following appeared in the London papers, Sept. 12, 1870:—

"LETTER FROM MARSHAL MACMAHON.—Marshal MacMahon, who has been residing at Pouru-aux-Bois, near Bouillon, at the château of the Mayor, has sent to the *Organe* of Namur the following

Having, therefore, put you in full possession of the principles upon which your treatment is to be based, all that I shall further attempt to do is to call attention to those medicinal armaments at our command which I consider most important in carrying out the principles of treatment indicated in these lectures. The exact disposal of the forces in any given case must be left to the judgment of the man who takes the responsibility of conducting the battle.

1. Of medicines given by way of the stomach, I would particularly call attention to ses-carbonate of ammonia. When treating the naso-pulmonary mucous membrane we must not look upon ammonia simply as a stimulant; it has a most marked and important action upon the mucous membrane, as it has upon the skin in Erysipelas; probably this is due to its influence on the blood and on the capillaries. It assists more than any one other drug of equal safety in restoring a healthy condition to a mucous

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interesting note :—Marshal MacMahon was wounded on the 1st of September, at six in the morning, at the very commencement of the last battle, in which he held no command. It was by order of the Minister of War, Comte de Palikao, and of the Committee of Defence that he executed the march which proved so fatal to the arms of France. This is what infallibly happens when people take upon them to direct the movements of distant armies from the closet. In these circumstances one can draw up a general plan, but one cannot descend to details; and this is what General Cousin de Montauban forgot. Marshal MacMahon's intention was to fall back on Paris, after having re-organised the army so unfortunately undone at Sedan. He was not permitted to accomplish his wise project. As soon as the state of his health will permit, Marshal MacMahon will not fail to publish proofs that he cannot be considered responsible for the immense disaster at Sedan. Between a victorious army and the frontier of a neutral nation there was no escape if an accident occurred."—*Daily Telegraph*, 12th Sept., 1870.

membrane affected with catarrhal congestion. It should be combined with other medicines under varying circumstances. Thus, if there is a high state of recently excited injection, tartarated antimony may be given with the ses-carb. of ammonia with the best effect. If there is great irritability of the membrane, morphia in small doses may be given with the ammonia, as I have already directed (p. 175) to stop a fresh cold.

With regard to antimony it is important to bear in mind that it ought never to be continued long. The good it can do is soon done if done at all, and directly it is accomplished the continuance of the medicine does harm. Of ammonia I would also say that, whereas when first administered it acts as a stimulant, it very soon loses its effect and becomes a depressant by its action on the blood. It should never therefore be too long continued. It is better to withdraw it for a time and give it again, than to keep on with it too long at once. With morphia it is necessary to be very watchful that it does not stop secretion, when free secretion is the best means of relief to a congested membrane, and that it does not stop cough, when cough is an indispensable means of clearing tubes choked with secretion. But these are matters with which you are no doubt perfectly familiar.[1]

[1] Aconite, one of the oldest (see Pliny and Dioscorides) weapons in our armoury, has of late years been restored to public confidence by its more careful preparation. It is so powerful a poison that both patients and doctors got to be afraid of it from its uncertain action when clumsily prepared ; and thus, instead of being in daily use, it was reserved as a last resource for very important occasions or used only as an external application. In the treatment of Chest complaints it deserves to stand in the front ranks, and is perfectly safe and manageable in the form of the present Pharmacopœia Tincture. The points to be especially borne in mind are, that it acts very quickly—and therefore that the danger is concentrated when full

Of ipecacuanha and squills I need hardly speak, their effects are so well known—one as a relaxing and soothing promoter of secretion, the other as an irritating expecto-

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doses are given at once although at distant intervals—but that this danger is quite removed by dividing the dose and giving it more frequently; thus, if it is wished to give ℥ xxiv in 24 hours, instead of giving ℥ iv every 4 hours the effect is better obtained and all risk avoided by giving ℥ i every hour, the medicine being stopped at any hour in the twenty-four if it appears to act too powerfully or to disagree. In doses of from ℥ i to ℥ ii every hour it is of the utmost use in the early stages of naso-pulmonary catarrh. I think its influence is best described by comparing it to the combined good of Ammonia, Antimony, and Morphia, without the special evils of either. But it must be remembered that its use is confined to the stage of active vascular turgescence, that it has a special and important evil of its own, viz., a paralysing action on the heart—that therefore the heart should be carefully watched during its administration—and that there are cases of weak heart and of mechanical obstruction to the circulation in which it is an unsafe remedy. But still the plan of giving it in minute repeated doses reduces the cases in which it cannot be given to a minimum.

In the treatment of Bronchitis in asthmatic subjects, Aconite may be brought in with the greatest service after Ammonia and Antimony, just as the Antimony has attained its end and begins to depress too much without compensatory good. At this point I am accustomed to substitute the Aconite for the Antimony before withdrawing the Ammonia, and with the best effect.

The properties of this important drug may be well summed up in the following statement of the results of the elaborate and careful experiments and observations of Dr. Fleming :—

"1. That Aconite is a sedative of the cerebro-spinal system, by its direct action upon the nervous matter and on the heart.

"2. That it is a powerful antiphlogistic.

"3. That it is calculated to be of great value in all cases where there is inordinate activity of the circulation.

"4. That it is contra-indicated where there is an obvious mechanical impediment to the passage of the blood, particularly through the heart or lungs."—(Inaugural Address, University of Edinburgh, 1844.)

rant, which assists in clearing the membrane of secretions already produced, and stimulates the mucous glands to contract and cease to secrete more. Ipecacuanha therefore may do harm in one way, and squills in another, if too long continued.

Senega irritates the cough. If there is too little cough in proportion to the secretions requiring removal it is an invaluable medicine, but I think its value is restricted to producing this effect. Although when masticated it excites the salivary glands by local irritation, I have never seen reason to believe that as an internal remedy it has this effect on the salivary glands, or that it excites the naso-pulmonary mucous membrane to increased secretion, as some appear to think: on the contrary, its effect is drying and irritating, and therefore senega should *not* be used if secretion is deficient. If the cough is already frequent it does harm.[1]

[1] Serpentaria (one of the ingredients of Tinct. Cinch. Co.) is a valuable adjunct to our other remedies; it is persistent in its effects as a stimulating diaphoretic, having some resemblance to camphor in its action on the brain skin and mucous membranes. It is of much value in combination with other remedies where there is a "typhoid" or sinking tendency; but for the same reason it is to be avoided where there is nervous or vascular excitement.

Copaiba, from its nauseous flavour and disreputable associations, is less used than it ought to be in affections of the naso-pulmonary mucous membrane, in which its influence is only second to that on the genito-urinary tract. It is in chronic bronchitis and chronic catarrh unattended with fever that it is especially valuable, correcting the tendency to excessive and muco-purulent secretion, and assisting in restoring the mucous membrane to a healthy condition.

Cubebs may be placed in the same category as Copaiba, with this decided advantage—that instead of deranging the digestive organs, it benefits them, and that it is by no means so disagreeable to take. It deserves a very high place among the remedies for naso-pulmonary catarrh, but caution is required in its use, otherwise secretion may be too rapidly stopped and irritation result.

Ammoniacum acts by promoting cough and thus assisting expectoration; and beyond this it has a further effect in stopping secretion, and afterwards producing excitability of the mucous membrane which may become excessive if not watched.

I consider olibanum a much more valuable drug than ammoniacum, and I am sorry to see it so little used. It has a remarkable effect upon the intestinal mucous membrane, arresting chronic dysentery and diarrhœa, and leaving a soothed condition of the bowel. I have seen the same effect produced upon the mucous membrane of the air-tubes—morbid secretion checked and altered without that irritation which is caused by ammoniacum. The olibanum may be used both by the stomach and by inhalation. It is probable that its topical effect is the more important.

Benzoin is another valuable remedy in restoring a healthy condition to a thickened naso-pulmonary mucous membrane. It may also be used by the stomach or by inhalation.[1]

Spasmodic contraction of the bronchi indicated, as I have already pointed out, by the high pitch of the *in*spiratory sounds (p. 60), is a very awkward compli-

[1] Chloride of Ammonium is not used as often as it deserves to be, probably in great measure from the difficulty in concealing its nasty taste, but this may now be easily done by the new Pharmacopœial Liquid Extract of Liquorice, which is in other respects also well suited to be given with the drug. The most valuable property of chloride of ammonium in naso-pulmonary affections is its power of rendering the secretions of mucous membranes less viscid and tenacious, at the same time that it is somewhat stimulant or tonic, or at least not depressant in its general effects. These are qualities which make it a most important adjunct to other internal remedies, and in addition to these it certainly soothes and tones the mucous membrane when used as a lozenge or inhalation. (See p. 204.)

cation ; and if not kept in check, it very much interferes with the restoration of the mucous membrane to a state of health. The most efficient means of relief for this spasm are—1. Smoking Savory & Moore's Datura Tatula. 2. Inhaling the fumes of burning nitre paper. 3. Smoking the "Cigares de *Joy*," sold by Wilcox, of 336, Oxford Street. 4. Ten to thirty drop doses of Etherial Tincture of Lobelia Inflata ;[1] and 5. When the spasmodic tendency

[1] To the above list of remedies for asthmatic spasm may be added the following, from each of which I have seen good in special cases:—

1. Papier Fruneau (à Nantes).
2. Dr. Palmer's anti-asthmatic papers (Dublin). See Appendix VI.
3. Ozone paper (Huggins, 235, Strand).
4. Papier de Barrel.
5. Martindale's pastilles (New Cavendish-street).
6. Cigarettes de Barrel.
7. Cigarettes of Eucalyptus globulus (Savory and Moore).
8. Pariss's Cigarettes Pulmoniques (Bell).
9. Cigarettes d'Espic.
10. Inhalation of ether.
11. Inhalation of camphor.
12. Inhalation of nitrite of amyl (with great caution). "Impure nitrite of amyl inhaled causes violent cough and irritation of the larynx. The pure nitrite has a remarkable effect in causing dilatation of the blood vessels with intense flushing and congestion of the head and face, the skin feeling excessively full and tense. From two to five drops of the nitrite inhaled from lint will give speedy relief in angina pectoris, and in some forms of asthma with pallor of the face. . . . Nitrite of amyl speedily loses its power if kept." Dr. Thorowgood's "Student's Guide to Materia Medica," p. 142.
13. Cautious inhalation of chloroform.
14. Chloral hydrate in doses of from five to thirty grains. See note, p. 209.
15. Indian hemp (Squire) either smoked or given internally (See note, p. 207).
16. Belladonna.

can be traced to (*a*) gouty, (*b*) rheumatic or (*c*) malarious causes, the administration of colchicum, alkalies, quinine, arsenic. (See pp. 202-3.)

Stramonium, administered by the stomach in quarter grain doses of the extract or twenty drop doses of the tincture, twice or thrice in twenty-four hours, becomes a very useful adjunct to other treatment under these circumstances.

I must not omit to remind you of the facility with which one part of the naso-pulmonary mucous membrane is able to act for the relief of another, as illustrated by the case I related of the gentleman whose spasmodic asthma was often carried off by sneezing, and who suffered from dyspnœa when a discharge of mucus from the nostrils was suddenly stopped (p. 42). We may often take advantage of this property of the mucous membrane with the best effect. Congestive tumidity of the bronchial membrane may be relieved by giving iodide of potassium in sufficient doses to produce the symptoms of a free coryza; and errhines may be used for the same purpose. Iodide of potassium, however, requires to be given with caution; for if it does not succeed in producing a free discharge from the nares and sinuses, it simply inflames the mucous membrane; and this inflammation may run down and aggravate the affection it was intended to relieve. Unless there was a syphilitic taint, I have never been satisfied that iodide of potassium acted beneficially upon a thickened naso-pulmonary mucous membrane in any other way than as a derivative, in the manner described.

I can speak much more satisfactorily of the influence of saline aperients acting as derivatives on a *different* tract of mucous membrane, and free, therefore, from the chance

of exciting a tumid or inflamed condition in the diseased one. One of the best forms of saline for this purpose is the Friedrichshall water. There is, however, a very valuable aperient mixture which I often prescribe, containing sulphate and carbonate of magnesia, with a small quantity of iodide of potassium, and a full dose of nitrous ether, which appears to suit some cases better than the Friedrichshall water,—producing a freer and more watery discharge, and helping to eliminate gouty and rheumatic poisons.

In some cases of considerable and long-standing thickening of the mucous and submucous tissues, it may be necessary to give small doses of bichloride of mercury for a considerable time.[1] Colchicum, sulphur and arsensic, too, which act so beneficially upon some affections of the skin, are often of great use in treating the respiratory mucous membrane.[2]

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[1] In some cases where the thickening of the mucous membrane is kept up by the frequent occurrence of catarrh, the persistence in small doses of opium will by keeping off these attacks permit the membrane to become restored to its normal condition. (See note, p. 210.)

[2] Where there is a tendency to alternation of affections of the skin and of the naso-pulmonary mucous tract—which may often be observed, especially in the rheumatic, gouty, syphilitic and strumous diatheses—whatever *constitutional* treatment has proved efficacious in the removal of the skin complaint *without exciting its metastasis to internal parts* is likely to assist in the treatment of the pulmonary affection. But it very often happens that in curing a skin complaint asthmatic and bronchitic symptoms are excited, and this shows that the treatment is not efficacious in the sense of attacking the diathetic defect, and the remedies which have this tendency should of course be carefully avoided. In some chronic cases the only way to keep the lungs safe is to maintain the skin disease; and an attempt should be made to do this in some part of the body out of sight, and where it will be of least inconvenience to the patient; on the whole, the shins or calves are the best. I have

But I am anxious not to leave this part of the subject without mentioning Tonics. Nothing can be more important in the treatment of Winter Cough than to improve the "tone" of the whole system of the patient by every means in our power. Zinc, iron, arsenic and quinine are the most important of such medicines; and I think their value may be taken to stand in the order in which I have enumerated them.[1] Strychnia has been highly recommended in Winter Cough complicated with Emphysema (see p. 75); but as it especially acts upon the muscular system, exciting the muscular fibres to spasmodic contraction, I see no reason to expect any special good effect from it upon diseases of the air-passages and cells; for, in the first place, we wish to diminish and keep off spasmodic muscular contraction of the air-tubes; and, in the case of the over-stretched air-cells, they are not muscular but elastic fibres which we wish to strengthen; and there is no reason for supposing that strychnia acts upon elastic tissues. If it does good, it can only be through its effect upon digestion, and perhaps on the muscular walls of the heart. In this

known many cases, especially in the old, in which patients remained free from cough and dyspnœa only so long as they were content to put up with a patch of Eczema on each leg. When this is found to be the case, and the patient is not too advanced in years, the proper plan of proceeding is to make a mild and insidious attack on the diathesis, which should be persevered in steadily till the constitutional condition is radically changed. (See p. 180.) This is generally best done by mineral waters and baths, and change of climate. (See Lect. IX.)

[1] Tincture of Eucalyplus globulus, introduced since the above was written, has proved a valuable tonic in catarrhal affections, accompanied with a tendency to remittent feverishness, and will sometimes suit when quinine disagrees. This will be worth remembering where there is a complication with spasmodic asthma, and quinine is found to bring on the spasm, as it sometimes will do. See Appendix III.

way, like many other medicines that might be mentioned, it may do good service; for we must ever bear in mind, that, in order to prevent degeneration of the Emphysematous air-cells, of the walls of the air-tubes, and, especially of the heart, every available means must be employed for keeping up the vigour of the nutritive functions; so shall we not only keep off degeneration of tissue, but promote the healthy repair of the diseased parts. (See p. 108.)

In extreme cases of Winter Cough life may sometimes be saved by the timely and protracted use of ARTIFICIAL RESPIRATION, a means of treatment to which I drew attention in the British Medical Journal, Jan. 30, 1869, in the following "clinical note:"—

"I have long been accustomed to prescribe artificial respiration, as an auxiliary to other treatment, in cases of chest disease accompanied by imperfect aëration of the blood, especially in the young, the weak, and the old. When it has been practicable to get this treatment fairly carried out, I have seen the most pleasing results. But the difficulties are many. It is evident that the Marshall Hall-method is inadmissible, as patients, seriously ill with chest disease, cannot bear to be rolled about. The method by alternating pressure on the sternum, also, cannot be borne, especially when there is heart disease. The Silvester-method, therefore, is the one which I have chiefly employed; but it has these among other disadvantages. 1. It is very seldom that there is room while the patient lies in bed for the arms to be carried back sufficiently. 2. When a patient is sitting up, if weak or suffering from heart disease, raising the arms above the head produces faintness. 3. The operation is very fatiguing and distressing to the patient, as well as to the attendant.

The result is that, in the cases in which it is most urgently required, it is quite a chance whether it can be effectively done. It happened that at the time Dr. Bain read his paper 'On an improved Method of Practising Artificial Respiration in Cases of Suspended Animation' (at the Royal Medical and Chirurgical Society, December 8th, 1868), I was attending an exceedingly bad case of capillary bronchitis in an old man, the subject of extensive Emphysema with dilated heart and anasarca. There was the greatest difficulty in preventing him from sinking into hopeless carbonic-acid poisoning. I had been fighting against this for several days by employing an attendant to use artificial respiration by Silvester's method, as often as the patient became more than usually blue and drowsy, but the fight was a most difficult one; the patient was unable to lie down, and the raising the arms, while he sat in an easy chair, fatigued and distressed him so much that it was evident he could not bear it much longer; yet he was quite unable to go on without it. Immediately after hearing Dr. Bain's paper, I visited the patient and altered the plan of proceeding. He sat in a high-backed easy chair. I got behind him upon a stool sufficiently high to give good command over his shoulders from above, and then, grasping them from before with the tips of the fingers towards the arm-pits, dragged him up with sufficient force just to take off his weight from the chair without unseating him, held him so for about three seconds, then let him down, and after a rest of about three seconds lifted him again as before. This was repeated twenty times, and the patient, instead of showing signs of fatigue and distress, said he felt revived, and the improved colour of his lips, nails and skin, and the brighter expression of his eyes, plainly told the good effect it had

produced upon his blood. He willingly consented to have the operation repeated every two hours. It was easily done by his attendants, and persevered in for four days and nights. The effect was so remarkable, that at the end of that time it was no longer required. I believe the operation saved his life."

I cannot too strongly recommend the adoption of the same plan in all that class of cases to which I have here referred. I would also point out how important it is in the young, the weak, and the old, when suffering from diseases impeding respiration, to prevent them from sitting or lying with the weight of the arms pressing upon the chest.[1] The weaker they become, and the more overpowered with carbonic-acid poisoning, the more completely is the weight of the arms and shoulders allowed to sink down upon the thorax, and thus to interfere with respiration. I believe that numbers of lives are lost by neglect of these precautions and of artificial respiration, just at the critical period when the fever and excitement of the congestive stage give place to the lassitude accompanying free exudation.

Under the head of the general conditions predisposing to Winter Cough, I have already intimated the importance of correcting all defects of assimilation and digestion. The internal medicines and diet necessary for this purpose must, of course, differ with the case; and I cannot do more in this place than remind you never to forget this part of the treatment.[2]

I have already shown, when analysing the reported cases under the heads of Colds and Coughs, that of all the

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[1] See Appendix V. on the Effects of "Tongue-sucking."

[2] See "On Diet and Regimen in Sickness and Health," etc., 5th edition, *op. cit.*

cases of Winter Cough, the cough left in summer weather in 45 per cent., and the short breathing was relieved in summer weather in 29 per cent.; and we found this relief to short breathing and to cough was really due to the removal of the irritability and thickening of the naso-pulmonary mucous membrane, under the influence of *warm soothing inhalations in the form of summer air.* These are very important facts to bear in mind with relation to treatment, not only as indicating the importance of wearing respirators, to which I have already referred (p. 186), but as pointing to the use of inhalations as a means of restoring the mucous membrane to a healthy condition. Inhalations may consist of fumes vapours, or atomised fluids.

My own experience of atomised fluids, except as a means of applying lotions to the nares and fauces, and for stopping pulmonary hæmorrhage,[1] is not very satisfactory. I object to their use, as a general rule, for affections below the glottis, in which it is necessary to allow the patient to respire during the operation. They have the great disadvantage of conveying too large a quantity of cold moisture into the air-passages, and are thus apt to produce all the evils of severe damp and fog.[2]

Fumes and vapours have not this objection, and are among the most valuable of our means of acting upon the naso-pulmonary mucous membrane. Nitrate of potass is of great service when used in this way. It appears to act upon the respiratory mucous membrane, when intro-

[1] I have often been able to arrest obstinate hæmoptysis by a spray containing alum, gallic acid, or perchloride of iron, when other remedies had failed.

[2] This objection is, to a certain extent, removed by more recent spray-producers, in which the spray can be used warm.

duced in the form of fumes dispersed through atmospheric air, much as it does on the pharyngeal mucous membrane when applied in the popular form of "sal prunella balls." It refrigerates and causes resolution of that flushed and tumid condition which I described when speaking of catarrh and asthma (p. 42). It is in this way, I think, that it so signally relieves some cases of spasmodic asthma. You will find that the fumes of nitre paper, and those of datura tatula, and stramonium, and the vapours of chloroform and ether, relieve different classes of cases, or the same case in different phases. When the prominent mischief is vascular injection and tumidity, the spasmodic contraction being only excited by the excess of these conditions, nitre fumes give the most relief. When, on the other hand, the nervous element is most prominent, the tendency to spasmodic contraction being so great that it is set up by a comparatively slight amount of flushing of the mucous membrane, datura tatula, stramonium, chloroform, and the like are the most potent remedies. The influence of the fumes of nitre upon the bronchial spasm is only a secondary effect, its most important influence being that it removes congestion and tumidity of the naso-pulmonary mucous membrane.[1]

Fumes of carbolic acid are extremely useful as a means of diminishing excessive purulent expectoration, and of removing the fœtor of discharges from the lungs of those in whom disintegration of lung substance is taking place. (See p. 151.)

The only satisfactory apparatus for this purpose with which I am acquainted, is the "carbolic acid vaporiser,"

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[1] See list of Antispasmodics, p. 194.

introduced, at my suggestion, by Messrs. Savory and Moore. This should be used three or four times a day in the patient's apartment, and especially the last thing at night, so that the atmosphere of the sleeping room remains impregnated with carbolic acid throughout the night.

The other materials which I use as fumes are gum benzoin, gum olibanum, and camphor. (See p. 193.)

For the inhalation of vapours I am accustomed to order Nelson's inhaler, to be used *without the sponge;* a pint of hot water being put into it, the temperature of which should not exceed 170° when inhalation begins.[1] The patient should inhale for about fifteen minutes at a time, and should not go out of doors, the same day that the inhalation is used, without a respirator. It is often necessary, therefore, to restrict the use of the inhalation to the evening, and thus we very much limit its usefulness. Much better results would be obtained by all these topical applications if we could secure their more frequent repetition—if, in fact, we could apply them to the naso-pulmonary mucous membrane as persistently as we apply a lotion to a skin disease, and the object should be to do this to the fullest extent possible under the circumstances.

The materials which I principally use to medicate the vapour of water are—

1. Compound tincture of benzoin.
2. Tincture of iodine.
3. Carbolic acid.
4. Creosote.
5. Spirit of camphor.

[1] A more satisfactory inhaler for general use has recently been made at my suggestion by Messrs. Maw. It is called the "Economical Inhaler."

6. Spirit of chloroform.
7. Spirit of ether.
8. Juice of conium.
9. Chloride of ammonium fumes, produced by adding a few drops of hydrochloric acid after liq. of ammonia has been mixed with the hot water. (See p. 193.)
10. Liq. of ammonia, or aromatic spirit of ammonia.
11. Tincture of myrrh.
12. Tincture of lobelia.
13. Tincture of stramonium.
14. Acetic acid.
15. Turpentine.[1] For the purpose of inhalation, Messrs. Hanbury, of Plough-court, have introduced several specimens of turpentine, the odour of which is far preferable to that of the turpentine in common use.

There is no class of complaints in which COUNTER-IRRITATION gives such unquestionable and unqualified relief as in affections of the respiratory tract of mucous membrane. The relief to the oppressive dyspnœa and to the irritability of tubes long narrowed by thickened lining, which speedily occurs under the influence of decided counter-irritation, is delightful to witness.[2] In severe and chronic cases I am in the habit of ordering at the commencement of treatment three blisters, one for the front of the chest and one for each side, between the scapula and the breast,

[1] A very valuable way of using turpentine in chronic bronchitis is to evaporate two or three tablespoonfuls in the patient's sleeping room during the night. This is easily and safely done by putting it into the upper portion of "Clark's Pyramid Food Warmer," taking care to put water in the lower receptacle.

[2] In the acute stage Dry-cupping by the elastic bottle is the most convenient, rapid, and efficient mode of relieving congestion, and it has the advantage of not interfering with the subsequent use of blisters or other counter-irritants.

to be used in succession ; each blister to be allowed nearly to heal before the next is applied. The application of the first I *insist* upon, the other two I leave to the patients' judgment to apply or not, as they choose, after having found what relief is obtained by the first. It is very rare indeed to find that they fail to apply all three—much more often they are so pleased with the effect as to volunteer to put on more if necessary. No form of counter-irritation is at all equal to a well-managed blister. Great caution should be taken not to leave the blisters on long enough to produce deep sores troublesome to heal. They should be quickly removed, and a warm linseed poultice applied before the vesicles are cut.

When the laryngeal and tracheal membrane is that most affected, little strips of vesication may be produced along the course of the trachea and at the sides of the neck, in the rear of the thyroid cartilage. It is better not to apply blisters over the front of the larynx. When the posterior nares and pharynx are most affected, the back of the ears or back of the neck are the best seats for external applications.

After the more decided effect has been obtained by blisters, iodine liniment and camphorated ammonia and turpentine liniments may be employed with advantage ; but if the case is severe or of old standing, and the patient will allow it, never fail to start with the blister. One caution, however, is needed, viz., not to blister while the skin is hot and dry, and the patient suffering from active inflammatory excitement.[1]

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[1] In the rage of the present day for novelties, old fashioned pitch plasters are apt to be despised, but great comfort and benefit may be obtained from a good-sized pitch plaster over the

In some stages of congestion of mucous membrane, especially where the tumidity is great and there is much reluctance to secrete freely, hot fomentations applied as near the affected part as possible give great relief, and, by promoting secretion, put the membrane in a better position to be benefited by other treatment.[1] It is surprising how much good may be done in a short time by repeated hot fomentations and poultices to the back and sides of the neck in affections of the nasal, pharyngeal, and laryngeal mucous membrane.

By a combination of such medicaments, appliances, and hygienic regulations as I have now briefly mentioned, we may hope to remove the susceptibility of the naso-pulmonary mucous membrane, and to reduce it to its normal thickness, so that the air-tubes may be restored to their natural calibre, and the obstructions to the expiratory tide removed. The importance of accomplishing these ends you will perfectly understand from what we have already seen respecting the causation of Emphysema, and the circumstances which aggravate it when it exists and give poignancy to all the sorrows which it inflicts.

Now, you will perhaps be inclined to charge me with

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front of the chest and between the blade bones, renewed from time to time throughout the winter.

[1] Since this was written, I have had the satisfaction of introducing to the profession a means of applying external heat, either dry or moist, in a manner offering especial advantages in the treatment of chest disease, where, if marked good is to be done, it is necessary to keep up a considerable, wide-spread, equable temperature for a long time, and to avoid oppressing the patient and interfering with respiration by heavy applications. (See Appendix VII. "On Poulticing by Steam.")

having altogether shirked the main question with which we are concerned, viz., the *Winter Cough*—with having discussed anything rather than the cough, and directed treatment to everything but the cough; and my answer to the charge is, that if everything is attended to which we have discussed, and everything satisfactorily treated that we have spoken of, there will be no cough left for us to treat.

Nevertheless, a word must be said about the cough *per se*. We have seen that frequent cough, and especially convulsive cough, is one of the causes—and a very potent cause—of Emphysema. (See Lect. II.) It will be very important, therefore, to allay the severity of the cough by some direct means while the more soundly curative treatment is being pursued.

This may be most effectually done by the sedatives and anti-spasmodics of which I have already spoken. But I may here especially mention three very valuable remedies — Indian hemp, lobelia, and bromide of ammonium. They have all the great advantage of acting speedily and decidedly. If they do not have a decided and speedy effect—if they do not, as it is popularly expressed, "act like a charm"—they do no good, and it is better to throw them aside. At least, that is my experience. (See note, p. 209).

Indian hemp is rather a troublesome remedy, from the difficulty of getting it of a reliable and equal strength;[1]

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[1] The following case published by me in the "Medical Times and Gazette," Sept. 5, 1863, illustrates at once the uncertainty of the drug and the perilous effects which it may produce :—

In December, 1860, N. S., aged 31, the wife of a policeman, came under my care at the Royal Hospital, suffering from spasmodic

but Mr. Squire has paid more attention to this point than any other chemist, and, therefore, I now always prescribe

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asthma. The paroxysms were of the greatest severity. The usual interval between the attacks was from two to three weeks, the longest interval for two years was six weeks, and that occurred only once. She had taken all the usual remedies without any marked benefit; and, as she was a simple, straightforward, intelligent woman, well educated for her station, whose statements therefore might be relied on, I thought it a good case upon which to try the cannabis indica, with which I was then treating several other cases of spasmodic asthma. The tincture was given three times a day, in doses gradually increased from five minims to twenty, without any perceptible effect; but on being increased to thirty minims it had a marked influence over the paroxysms, without producing any unpleasant symptoms. It was continued in this dose until several of the usual periods had passed over without an attack of asthma. It was then discontinued, but, another paroxysm occurring, the medicine was renewed. After it had been again taken for a short time, the stock of tincture at the Hospital became exhausted, and a fresh supply was procured, from which the patient received her usual weekly allowance. Having taken one dose out of her mixture, containing thirty minims of tincture as before, she became very ill, but not feeling sure that the medicine was the cause, and fearing a return of asthma, she repeated the dose as soon as she got better. The same symptoms set in as after the first dose, and she herself wrote the following account of them, and brought it to me on her next visit :—

"After taking the medicine the head became giddy, then came a drawing pain at the chest and then at the heart. Then came pinching pains in the flesh of the body, and bearing down pains in the loins, and the bowels and bladder acted with force. Then the tongue became swollen and drawn to the roof of the mouth, the flesh felt puffed all over, and tingled. Then retching came on. Then a continued yawning with a shiver. Then I felt as though I wanted to be held tight, like hysterics, and the power of speech seemed lost, and all sounds heard seemed to be at a distance. So it continued five or six hours, the head being very bad all the time, with noises in the ears; and when the head was laid down it felt heavy, with a hot swimming coming over it repeatedly. Then I fell into a deep sleep—unnaturally deep—which lasted all night

his preparations of Indian hemp. Indian hemp is most likely to do good when the cough is accompanied by tendency to fitful Bronchial spasm, or when it occurs, not in long convulsive fits at distant intervals, but in a never-ceasing wearing and tearing bark.

Etherial tincture of lobelia has great power in relieving the asthmatic spasm in a certain number of cases, and in stopping those convulsive fits of coughing which occur, almost like Whooping-cough, with distinct intermissions. It increases secretion. It often acts quite magically upon those distressing and exhausting attacks of convulsive cough which are, of all others, the most likely to produce Emphysema. It is in this same description of cough, especially when combined with hysterical excitement, that bromide of ammonium often proves useful.[1]

I must just mention bismuth as another direct means of stopping cough, though it acts by an indirect route. If you find that the cough always comes on when the stomach is empty, bismuth will stop it after everything

after which, having taken a little coffee, the same symptoms continued more or less during the day, till they gradually went off."

After receiving this report from the patient, I diminished the dose to eight minims, but it produced the same train of symptoms, though in a much milder degree, and the drug was obliged to be discontinued, as the patient was afraid to take it.

[1] Chloral.—To the list of remedies having a rapid action on the cough must now be added Chloral Hydrate. In doses of 5 to 10 grains, dissolved in water and flavoured with Liquid Extract of Liquorice, it is a most potent remedy in some cases of irritable and paroxysmal cough; but unless it acts beneficially at once, it should be discontinued.

Conium.—I have referred to the use of Conium as an inhalation, but not to its internal use. It is, however, a most valuable sedative for some irritable coughs, and may be given either in the form of juice, extract, or tincture. It appears to act as a sedative to the spinal cord.

else has failed—that is, everything else except cod-liver oil and food—and a patient cannot always be eating, or sipping oil for the sake of keeping off cough. There can be no doubt that the bismuth in these cases acts through the gastric fibres of the pneumogastric nerve. Hydrocyanic acid will often have a similar effect, but the bismuth is a safer and more persistent remedy.

Digitalis is of great use when the cough is kept up or excited by a too rapid and fitful action of the heart. Digitalis steadies the heart.[1] (See p. 108.)

The less important, but still useful means of allaying cough are very numerous; but I will not detain you by enumerating them, as they are most of them familiar to us all.

I must not forget to mention the treatment of Post-nasal catarrh. (See Lect. IV. p. 89.) Although at first sight a very trifling complaint, Post-nasal catarrh is unquestionably very troublesome to cure, and is very apt to return. The difficulty is mainly due (1) to the awkwardness of applying topical remedies to the parts principally affected;

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[1] Bimeconate of Morphia (Squire).—When an opiate is unavoidable, the Bimeconate of Morphia should be the form selected. It disagrees much less with the digestion than opium *per se*, constipates less than other forms of Morphia, and is less inclined to produce headache and other unpleasant symptoms. I may here mention that I have ascertained by repeated experiments, that the use of Pancreatine after meals will keep up good digestion in spite of the paralysing effect of opiates. This is a most important clinical fact, removing the greatest of the difficulties which lie in our way when we find it necessary to continue the use of opiates. I have seen 3 and 4 drachms of Liquor of Bimeconate of Morphia taken daily, without any defect of digestion accurring so long as a dose of Pancreatine was taken with each meal, in a patient who, without this aid, vomited all solid food undigested whenever the Bimeconate or any other opiate was taken. (See note, p. 196.)

(2) to the almost invariable existence of a diathetic cause; and (3) to the length of time which the complaint has usually existed before the patient comes under treatment. As in all affections of the naso-pulmonary mucous membrane, the first point is to make out the nature of the existing *morbid constitutional state*, and to apply appropriate diathetic treatment for its removal. (See p. 180, and note, p. 196.) But, unfortunately, this alone will not be sufficient; for the local affection will seldom yield without some topical applications; and it is in settling the form of this local treatment that I have found the greatest trouble. After trying a great number of applications in the form of spray, injection, gargle, lotion, inhalation, snuff, and lozenge, I have come to the conclusion, that the best for the majority of cases is the combination of:—

1. A medicated injection.
2. A medicated snuff.
3. A medicated lozenge.
4. A rubefacient liniment.

The injection consisting of borax, ʒj.; glycerine of carbolic acid, ʒij.; bicarb. of soda, ʒj. to half a pint of warm water.[1]

The snuff consisting of camphor, tannic acid, white sugar, and high-dried Welsh snuff, of each ʒj.

The lozenge consisting of camphor, gr. ij.; tannic acid, gr. ½; hydrochlorate of morphia, gr. $\frac{1}{36}$; white sugar, gr. x.; acacia gum, gr. ij.

The best rubefacient is pure compound camphor liniment.

The injection should be used night and morning. From

[1] This may be varied by substituting for the Borax, Chloride of Ammonium, or Chlorate of Potass or Condy's fluid, in certain cases.

three to four lozenges should be taken each day, one of which should be taken at bed-time, and one on waking in the morning. The snuff should be used once in the morning, once in the evening, and once or twice in the day, and it is best applied by means of a little elastic tube, one end of which is charged with snuff, and pushed into the nostril, the other end being put into the mouth, and the snuff blown up the nose with a slight puff.[1] The liniment should be well rubbed behind the ears and at the back of the neck twice or thrice a day.

I ought to add that the snuff must be discontinued should a fresh attack of nasal-catarrh happen to set in, but should be resumed on the subsidence of inflammatory symptoms. (See note, p. 176.)

In concluding these details of treatment, I wish to draw your attention to a very important practical point, about which there is apt to be great misapprehension, viz., *the season of the year in which it is most necessary to pursue treatment for the radical cure of a Winter Cough.* —IT IS NOT IN THE WINTER, BUT IN THE SUMMER.— It is not in seasons of rebellion that the institutions of permanent peace can be best established. It is as much as can be reasonably expected in such times, if human life is protected, serious catastrophes averted, urgent necessities provided for, and the various elements of rebellion scattered and repressed. It is in the more quiet after-time that wounds must be healed, differences adjusted, the under-current of disaffection eradicated, and securities obtained against the recurrence of disasters.

In a severe case of Winter Cough, the first winter in

[1] The lozenges, snuff, and tube are kept ready prepared by Messrs. Bell, Oxford Street, Messrs. Savory and Moore, New Bond Street, and other leading chemists.

which we are consulted must often be occupied by a succession of skirmishes with fresh attacks of Catarrh, and with a more or less successful battle with a chronic pulmonary rebellion. If we succeed in dispelling the cough before the warm weather comes to our assistance, we must often consider ourselves fortunate.

However this may be, we have seen by the cases I have reported, and we know by daily experience, that, in a large number of instances, when the long looked-for warm weather comes at last, the cough does go, and the patient thinks himself well. Both we and our patients are then apt to be so pleased at the change, that we at once withdraw our forces, glad to believe that peace is firmly re-established. But if we turn for a moment to our report, we shall see how exceedingly insecure is this summer-weather peace.

From a careful analysis of the circumstances attending cases of Winter Cough, in which the cough left in summer weather, and of those in which it did not leave, we found that the essential difference between them consisted in the degree to which the affection of the mucous membrane had extended deeply into the ramifications of the bronchi. (Lect. IV., p. 115.) I then showed you that, on comparing the cases, there was found to be a gradual assimilation between those of Bronchitis without Emphysema and those with Emphysema, in respect to the way in which they were affected by colds, and that this took place in proportion as the Bronchitis had become a deeply-seated and abiding affection. We found that the necessary condition to determine colds to fall at once upon the chest, was the existence in the bronchi of a semi-inflamed condition—a condition of imperfectly eradicated Bronchitis—which kept up a constant irritability and susceptibility to a renewal of the

half-cured disease immediately an exciting cause was presented.

The only connection we were able to trace between the presence of Emphysema and the tendency of colds to fall first upon the chest, lay in the fact that, in such cases, the Bronchitis had extended deeply into the bronchial ramifications, and had become so permanently lodged in the smaller bronchi, that it remained but partially cured there, even when the soothing air of summer upon the larger bronchi and upper parts of the naso-pulmonary tract had allayed irritation and relieved or taken away the cough. And we found that what applied to the relief or non-relief of cough by summer weather applied also to the short breath. I must repeat here, therefore, under the head of Treatment, what I said when analysing the causes of colds and coughs—that our anxious attention must be directed to the importance of leaving no means untried which can give a chance of radically and permanently removing every lurking trace of Catarrh, or Bronchitis, or of their effects upon the mucous membrane, before we let our patient consider himself safely cured.

We must only be satisfied when, by all our methods of examining and testing the respiratory organs, we cannot detect a lingering trace of disease, and when, after this, we have instructed our patient by what means he can best maintain this restored condition till it has become habitual.

It is in the summer that this part of the treatment can be best commenced, and, if possible, it must be carried out through the succeeding winter. We cannot consider our case complete till a winter has been passed through without cough or short breath.

This is the time when we should fall back upon that

"great gun"—change of climate. (See Lect. IX.) I have reserved it till the end of the lectures, as in practice I reserve it till the end of the treatment, because I am convinced that this is the time when, as good generals, we should bring it into action. When we have conducted our patient safely through the first winter in which we are consulted, and guided him through the succeeding summer; when we have done all that is possible to restore a healthy condition of his respiratory organs, and brought him to the middle of autumn with no cough and no short breath; when he begins to look at the approaching winter with dread, lest his enemy should return and call for a renewal of his last winter's regime; when he is tired of restrictions, and turns sick at the thought of goloshes, water-proofs, respirators, physics, inhalations, and all the rest; when even his gratitude to his physician is beginning to be overbalanced by the longing to forget every reminder of an invalid's life—then is the time, in my opinion, to send our patient for the winter months to some delightful climate, where he may continue his summer liberty without risk, and substantiate his cure by a prolonged freedom from Catarrh, and by the invigorating influence upon his general health of an active out of door life.

LECTURE IX.

There is a land, of every land the pride,
Beloved by Heaven, o'er all the world beside ;
And in that land of Heaven's peculiar grace,
The heritage of nature's noblest race,
There is a spot of earth supremely blest,
A dearer, sweeter spot than all the rest.
Where may that land, that spot of earth be found ?
Art thou a man—a patriot—look around !
Oh, thou shalt find, howe'er thy footsteps roam,
That land thy country, and that spot thy home.

MONTGOMERY.

Treatment continued.—Change of climate.—Different stages and causes of Naso-pulmonary Catarrh and Emphysema, and the most suitable Climates.—Extracts from the works of Scoresby Jackson, Walshe, etc., Classified list of Climates.

IN prescribing climatic treatment for Winter Cough, the five clinical groups into which I divided our cases in the beginning of these Lectures, will again claim the first place in your considerations. (See Lect. I., p. 3.)

You will recollect that these groups consist for the most part of various combinations of Bronchitis and Emphysema, and that in investigating the causes of Winter Cough, we found Naso-pulmonary Catarrh to be the most potent and most frequent of all.

It is upon Naso-pulmonary Catarrh that climate has the most important and satisfactory influence; and whether we are treating a case in which it is the sole morbid condition, or one in which it has led to Emphysema, we shall always have to give it the first place in forming our decision as to the kind of climate to recommend. But this affection, as we have now seen, passes through different stages, and is dependent upon different diathetic causes, all of which must be considered in prescribing climatic treatment. (See Lect. VI. and VII.)

For practical convenience we may consider Naso-pulmonary Catarrh under the following heads :—

1. Morbid sensitiveness of the mucous tract.
2. Inflammation of the mucous membrane, with deficient secretion.
3. Inflammation of the mucous membrane, with excessive secretion.
4. Chronic thickening of the mucous membrane, the result of the repetition of the second and third of the above conditions.
5. Chronic thickening, the result of one severe, neglected and protracted attack of Naso-pulmonary Catarrh.
6. Disintegration of lung-substance, the result of repeated attacks of neglected catarrhal congestion, or of one such attack occurring under unfavourable diathetic or other conditions. (See Lect. VI. and VII.)

For practical purposes, also, it will be convenient to consider the Emphysematous complications of Naso-pulmonary Catarrh, under the following heads :—

1. Emphysema due to accidental overstraining of the air-cells, independent of catarrh.
2. Emphysema, the result of repeated temporary obstructions of the air passages.
3. Emphysema, the result of permanent obstruction of the air passages.
4. Emphysema, the result of recent and still present obstruction of the air passages, by an acute attack of Naso-pulmonary Catarrh. (See Lect. VII., New Instruments for the Treatment of Emphysema.)

5. Emphysema of great extent, and of old standing, and with all the indications of broken down air-cells and tissue degeneration.

The diathetic states which will principally call for consideration in climatic treatment are the Rheumatic, the Gouty, the Strumous, the Tuberculous; and the complication of a tendency to spasmodic asthma will always be an awkward one to deal with, and one which will not permit of neglect. (See pp. 194-6.)

The extreme importance of climatic treatment in the cure of Winter Cough cannot be more forcibly demonstrated than by turning back to the analysis of our cases, and observing to what extent and in what forms climatic influences were found to have been the original causes of Winter Cough, the causes of its renewal, and of the aggravation of its complications. (Lect. V.)

The first attack of cough was ascribable to cold and Bronchitis in 73 per cent. of all the cases examined (66 per cent. cold and Bronchitis, 7 per cent. Bronchitis).

The cough was not aggravated by any other cause than fresh colds in 70 per cent. of all the cases, and they were the especial causes of short breath in 22 per cent.; and in 37 per cent. the colds spoken of, as accounting so largely for the aggravation of both the short breath and the cough, began as attacks of ordinary nasal catarrh (34 per cent. began in the nose, 3 per cent. in the nose and throat).

Wet feet and getting wet were the most potent causes of fresh colds in 31 per cent. *Cold winds* in 10 per cent. *Sudden changes of temperature and draughts of cold air* were the most potent causes of fresh colds in about 37 per cent., and aggravated the cough in 2 per cent.

Damp and fog or moist air were the most potent causes

of fresh colds in 19 per cent., aggravated the cough in 4 per cent., and were the things most inclined to make the breath short in 24 per cent. *Cold weather* was the thing most inclined to make the breath short in 7 per cent. *Change of weather* aggravated the cough in 7 per cent., and especially affected the short breath in 7 per cent., while *Summer weather* produced freedom from cough in 45 per cent., and relieved the short breath in 29 per cent.

It is very clear, then, that our first object in climatic treatment for the cure of Winter Cough should be to find out some delightful place where such things are unknown as wet feet and getting wet, sudden changes of temperature, cold winds, draughts of cold air, fogs, mists, drizzling rains, cold weather and change of weather, and where fine *Summer weather* is to be found throughout the year. (See Cairo, Appendix VIII.)

The natural tendency to spontaneous recovery is so strong in mucous membranes that, in all the early stages (see Lectures II. and VI.) of naso-pulmonary disease, fair play alone is necessary to allow of the recovery of a normal condition. In this climate, where any day may renew or aggravate the original complaint, there is no fair play for treatment. Let a patient be placed for a sufficiently long time in an atmosphere in which he can spend a large portion of his day in the open air without any risk of fresh colds, and, as a rule, the cough will gradually be cured without further treatment, and so much of the short breath as depends upon obstructed air passages will disappear at the same time.

With regard to Emphysema, the degree of recovery under the conditions I have described will depend upon its extent and the length of time it has existed. Where

it is the effect of a recent and still present obstruction of the air passages by an acute attack of Naso-pulmonary Catarrh—that is to say, where the air-cells are kept in a state of over-distension by an obstructed expiratory tide, but have neither been so far overstrained as to completely spoil the elasticity of their walls (see description of Residual-Air-Pump, Lect. VII.), nor have remained so long over-distended as to have suffered from serious tissue degeneration—any treatment, whether climatic or not, which completely removes the Naso-pulmonary Catarrh and the consequent obstruction of the air passages, at the same time that the tone of the general health is restored, will cure the Emphysema. This is most important to know and to bear in mind; for these are of all cases the most hopeful and satisfactory. On the other hand, where the Emphysema is of great extent and of old standing, with all the indications of broken down air-cells and of tissue degeneration, no treatment, whether climatic or not, can produce a radical cure, and such benefit as can be derived from change of climate will require something more than conditions which merely secure immunity from fresh colds.

It is in these cases that the necessity for a highly tonic restorative quality in the air exists to the greatest extent; but as they are frightfully aggravated by catarrhal complications, it is equally necessary to provide against these as well; and this places us in the most difficult position in the choice of a suitable climate, for the rarest of all climates is the conjunction in the highest degree of warmth, equability, and tonicity.[1] The greatly reduced power which lungs in this condition possess of aërating the blood makes it necessary to supply them with air of the greatest purity and density; yet the dangers of

[1] Upper Egypt and Nubia are the best types of such a climate.

catarrh make warmth a desideratum, and warmth is too often inseparable from moisture ; one of which conditions is inimical to density, and the other to purity. In such peculiar cases, therefore, we are obliged to make the best compromise we can with these opposite requirements, but the condition of *tonicity* must always take the lead, and we must endeavour to make up by medical and hygienic precautions for the deficiencies in the anti-catarrhal qualities of the climate selected. Indeed, I know of no climate, and no stage of Winter Cough, in which these precautions can be altogether abandoned without risk.

The following good advice on this subject is given in the late Dr. Scoresby Jackson's work on Climatology :—

"*Bronchial and Laryngeal* affections are amongst those to which change of climate is most beneficial. It is only, however, in their chronic forms that this remedial agent can be brought to bear upon them ; and the invalid should be particularly cautious, even when suffering from these diseases in their chronic forms, that he does not by any careless exposure to cold currents of air, by visiting cold churches or picture galleries, or by too rapid travelling, or too high living, convert his complaint into one of an acute character. This may be easily done ; and, moreover, it would probably be followed by symptoms of an alarming nature. A previous preparation by moderate living, by the use of simple alterative medicines, the regular use of bathing and friction, a well-regulated diet, and a moderate amount of out-door exercise, will be of material advantage to the patient. He should set out for his winter quarters during the month of September, arriving at them by easy and careful journeys. His diet should consist of light nourishing food, with a moderate allowance of wine, according to his condition ; but the latter had better be omitted altogether if

it give rise to derangement of the digestive system—a danger to be at all times carefully guarded against. His apartments should be well chosen in their aspect, airiness, and good prospect; they should be kept dry, tolerably warm, and well ventilated. He should take sufficient out-door exercise, without exposing himself to the direct rays of the sun, from which he may protect himself by means of a light umbrella, or to the cold and damp air of the mornings and evenings. Especially he ought to avoid evening visiting in hot, over-crowded rooms. On dull days he should have a fire constantly in his sitting-room, and during the prevalence of cold, harsh winds, he should remain in-doors. His clothing should be sufficiently stout to protect him in a measure from vicissitudes of temperature; flannel next the skin being by far the best. A loose overcoat and strong boots are also essential. His baths should be carefully continued. In addition to the qualifications of mildness and equability, the climate to be selected in such cases will require to be of a dominating, dry, or humid character, according to the condition of the patient. If he be of a leuco-phlegmatic temperament, with a flabby atonic muscular system, and a copious bronchial secretion; a dry and rather invigorating climate will be indicated, such as the Undercliff, Clifton, the milder parts of Brighton, or Worthing, Montpellier, Nice, Algiers, Egypt, &c. If, on the contrary, he be of a nervous temperament, with a dry and sensitive condition of the air-passages, with little or no expectoration, a mild but more humid climate should be recommended, such as Torquay, and the south-west coast generally, Bute, Queenstown, Pau, Rome, Madeira, &c. A summer tour to any of the watering-places in lofty situations, such as those of the Pyrenees, together with a careful course of mineral waters, form an excellent adjunct to the benefits previously derived by wintering in a mild climate." (p. 69.)

The other principal headings into which I have divided Naso-pulmonary Catarrh and Emphysema for climatic consideration involve these prominent questions :—

1. Whether the naso-pulmonary disease is accompanied with great susceptibility to repetition. or is only the result of some unfortunate combination of circumstances not disposed to recur. In the latter case, of course, we shall be free to select a climate best suited to the removal of the thickened mucous membrane, with less regard to its anti-catarrhal qualities ; that is to say, we may place tonicity and warmth above equability.
2. Whether the naso-pulmonary affection is complicated with a relaxed condition of the membrane, and perhaps with dilated tubes, accompanied by excessive secretion, or with an irritable inflammatory condition with deficient secretion. In the first case the summer warmth of climate must be combined with dryness, in the latter with moisture ; that is to say, we shall require for the one warm and bracing climates, and for the other sedative climates.
3. Whether the Emphysema is accompanied with a constant susceptibility to fresh attacks of catarrh ; or is the result of some past attack, without the tendency to its recurrence being particularly strong, although its effects upon the mucous tract have become permanent. In the former case the anti-catarrhal qualities must engage our first attention in the selection of a fitting climate ; in the latter we may allow the consideration of removal of the chronic thickening of mucous

membrane to rule our choice, with less regard to the dangers of recurrent catarrh ; and thus again we shall have to decide between the warm and bracing and the sedative types of climate. But we may also introduce the consideration of selecting a climate especially on the grounds of the impregnation of the atmosphere with such matters as turpentine, iodine, or sulphur.

4. Whether the Emphysema, having resulted from accidental straining of the air-cells independent of catarrh, as for example, when it has resulted from over-lifting, over-running, or from the violent overstrain of a long past fit of convulsive coughing, such as whooping-cough. These cases resemble the herniæ of the surgeon's practice —the mischief is done, and the cause of the damage has past. The treatment must consist in informing the patient of the various accidents and influences he is specially to avoid as likely to renew or aggravate his complaint, and in adopting such direct treatment as may help to cure the local damage he has received. We may therefore throw all our consideration as to climate into the question of selecting that best suited to the Emphysema *per se*, or simply that which the general health of the patient requires, independent of his local disease.

And this brings us to the last question which I propose to treat to-day, viz.

5. The necessity for considering the diathesis of the patient when prescribing climatic treatment for his Winter Cough. It is a matter of great importance; for whether his complaint has been

> brought about through a rheumatic, gouty, syphilitic, strumous, or other constitutional taint, the other effects of climate will be most materially influenced by those which it may have upon these general conditions of the system, where the taint is strong and unquestionable in its character. I advise you to give it the foremost place in guiding your choice of climate; for you will do but little towards the radical cure of the local complaint till you have removed its constitutional cause.

The tuberculous diathesis adds frightfully to the perils of all catarrhal affections, and will claim our attention on this account rather than as a *cause* of Winter Cough. When the constitutional tendency to consumption is at all marked, we shall have to be constantly on our guard against the occurrence of local congestions and inflammations during attacks of catarrh, for *whatever increases the vascularity of an internal organ in the tuberculous diathesis involves the risk of tuberculisation of the affected part.* (See Lect. VI.) And again, when we discover physical signs of that lung-disintegration, which is one of the serious effects of repeated and neglected catarrhal attacks, grave as its importance must be allowed to be under the most favourable diathetic conditions, the co-existence of a tuberculous predisposition at once invests it with all the horrors of advancing consumption of the lungs, and will necessitate a choice of climate entirely ruled by this consideration. To prevent the Winter Cough running on into consumption will be the first consideration in the climatic as well as in every other form of our treatment of the case. But the exact quality of the climate to be selected for the tuberculous will differ so materially according

to the circumstances of each case, that I must refer you to my works on consumption [1] for these details, as they would lead me beyond the limits of this lecture if I attempted to discuss them here.

With regard to the influence which a tendency in your patient to spasmodic asthma ought to have upon your councils, I will only say, at present, that you will be frustrated in all your endeavours to help him if you do not make a fortunate selection of climate in this respect; and I may add for your comfort that it is the most fickle difficulty of all! For you will never be able to be sure what climate will suit the asthma till you have tried it, and it will as often as not be the very one which appears the least suited to all the other conditions of your patient.[2] Thus, I have just seen a young lady who has suffered severely from general and frequently aggravated catarrh, accompanied by some consequent disintegration of lung substance, for whom all sorts of delightful anti-catarrhal changes of climate have been tried without avail; the fact that she had a lurking spasmodic asthma complicating her troubles having escaped consideration. At last, by what was considered a most unfortunate necessity, she was called upon late in autumn to visit the highlands of Scotland; and to the infinite surprise of her friends she got suddenly better, and, during a stay of a few weeks, more completely recovered than had ever been thought possible. The place had suited her spasmodic asthma, and the removal of this had more than half cured all the rest of her complaints.

In concluding this lecture, let me advise you to read

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[1] "On the True First Stage of Consumption," p. 47.—Churchill. "On Tuberculosis," &c., pp. 44, 45. Churchill.

[2] See Appendix vi.

the excellent chapter on "Change of Climate," just published by Dr. Walshe in the new edition (the fourth) of his work on "Diseases of the Lungs," from which, and from a valuable article on Climate, by Dr. T. More Madden, of Dublin,[1] I have selected the following classified list of places which may be particularly recommended in different cases, guided by the considerations which I have now pointed out.

Dr. Walshe says, page 594, "An invalid, condemned to winter away from his own hearth, will instinctively divide climates *in limine* into home and foreign. His likings, and the nature of his ties, rather than the medical fitness of things, will guide him at once to a choice. But some general grounds of preference on either side might be placed before him in this wise. He might be told that in all English places of resort he must be prepared for a mean temperature very little superior to that of London; for almost abiding gloom of sky; for windiness more or less constant and violent; for, practically speaking, a protracted adieu to almost all the enjoyments of out-of-door life; for total absence of the charm of active and fragrant vegetation in the surrounding country; for short, foggy, often sunless days; and, lastly, for the deficiency of those novel scenes, and those bright, gay, and animated groupings of the population around him, that give interest to the streets and roads of continental sanitaria. But he might be reminded, *per contra*, that on his own soil he will find good, really nourishing food, and familiar domestic comforts; that, if he walks, his sense of decency will not be offended, and he will run no risk of being blinded by dust; that mosquitoes are a thing unknown; that he will escape the oft-times distressing glare of an over-brilliant

[1] "Dr. Dobell's Reports on the Progress of Medicine in different parts of the World." (Vol. i., 1869.) Longmans.

sunlight; that he may every now and then stumble upon a lovely day, the rich charm of which proves all the greater, because it is so very, very rare; that he will escape that form of atmospheric infliction, far from uncommonly experienced even on both Riviere, in which, while a fierce sun well-nigh scorches one side of the frame, an icy mountain-blast freezes the other; that he will linger within reach of home associations, and of the kith and kin he cares for; that he will be saved from the annoyance of that unsleeping, ever active cupidity, which strives to wring from him twelve months' pay for six months' supply; add that he will never know that pain of feeling himself a sort of tolerated being, which even the domiciled resident in a foreign land is sure from time to time to have forced upon him.

"Appropriate climates for summer and autumn are to be found in all European countries in abundance. Those adapted to winter and spring need only be considered in this volume; and it may be observed that the fitful inclemency of spring is found to be infinitely more difficult to legislate for than the steady rigour of winter."

Climates for Winter and Spring.[1]

Land Climates.

Group 1.—*Sedative Climates.*

Sub-groups.—1. British Isles—Sidmouth, Torquay, Penzance, Cove, Jersey, Coast of Kerry.

2. France[2]—Pau.[3]

3. Spain—San Lucar.

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[1] See also Dr. Henry Bennett's charming work "Winter and Spring on the Shores of the Mediterranean, &c." and various articles by different authors, in "Dr. Dobell's Reports," op. cit., vol. i., 1869; vol. ii., 1870.

[2] See Appendix IX., Climatology of France.

[3] See Appendix X., Climate of Pau.

4. Italy—Pisa, Rome, Venice.
5. Mediterranean Islands—Corsica (Ajaccio), Corfu.
6. Eastern Atlantic—Madeira, Azores.
7. North America—Florida.
8. Western Atlantic—Bermudas, Bahamas.
9. West Indies.
10. Virgin Islands.
11. Algiers (see note to "Stimulant Climates," 5).

Group 2.—Stimulant Climates.

Sub-groups.—1. British Isles—Worthing, Hastings, St. Leonard's, Grange, The Undercliff, Clifton.

2. Shores of the Mediterranean[1]—Hyères (Costabella Carqueiranne), Cannes,[2] Le Cannet, Nice, Cimiez, Villefranche, Monaco, Menton, Bordighera, San Remo, Pegli, Nervi, Spezia.
3. Mediterranean Islands—Capri, Sicily (Palermo, Catania), Sardinia (Cagliari), Malta, Majorca (Joller).
4. The Peninsula — Malaga, Barcelona, Lisbon, Cintra.
5. North Africa—Upper and Middle Egypt,[3] Nubia and the Desert, Algiers,[4] Tangiers, Mogadore, Canary Islands.

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[1] See Appendix IX.

[2] See "Sketch of Cannes and its Climate." By Th. De Valcourt, M.D. Churchill. 1873.

[3] See Appendix VIII., Climate of Egypt, and "Egypt as a Health Resort," &c. By A. Dunbar Walker, M.D. Churchill. 1873.

[4] Algiers appears to hold a sort of intermediate position between sedative and stimulant climates.

6. South Africa[1]—Cape Town, Bloemfontein,[2] Natal, The Desert.
7. Australia—Victoria, Western Australia (Perth).
8. Tasmania—Hobart Town.
9. New Zealand[3]—Auckland.

Group 3.—*Climates having an atmosphere artificially impregnated.*

Sub-group.—Resinous and Balsamic—Arcachon,[4] Bournemouth, Isla de los Pinos (lying south of Cuba).

Group 4.—*Climates deriving speciality of character from their altitude above the sea level.*[5]

Andine Valleys—Arequipa, Rondos, Huariaca, Zarma, Canta, Matucana, Huanuco, Jauja (places varying

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[1] See Appendix XI., Climate of South Africa.

[2] The most unquestionable climate for chest complaints in South Africa is to be found at Bloemfontein, about 680 miles from Cape Town, 470 from Port Elizabeth, 385 from Graham's Town, and 150 miles north-west of Colesberg, on a tributary of the Modder River, about 5,000 feet above the sea level, in latitude 29° 8′ south. It is reached from Port Elizabeth by Cobb's coach passing through Graham's Town and Cradock.

[3] See New Zealand. "Dr. Dobell's Report," op. cit., 1869, 1870.

[4] See Appendix XII., Arcachon, a valuable climate for cases attended with great nervous excitability and irritability of mucous membrane.

[5] One of the most interesting subjects of the day is the influence of altitude upon health and disease; while there is a singular absence of exact information as to the main physiological facts involved in the question. For this reason I have been at some pains to make the following calculations, based upon *assumptions* approaching as nearly to the truth as the facts at present possessed will permit.

These calculations will, at least render conspicuous the importance of the considerations at issue, and, at the same time, will show

in elevation from 5,000 to nearly 11,000 feet above the sea-level).

Plateau more accessible[1]—Santa Fe de Bogotà, in New Granada, one of the most equable climates in the world.

Brazilian—Morro-Queimado, Cantagallo, San Paulo, 40 miles inland from the port of Santos, 2,300 feet

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the urgent need of new and precise observations to take the place of the *assumptions*.

Dr. Treutler and Dr. B. Stewart, of Kew Observatory, inform me that one hundred cubic inches of dry atmospheric air temp. 32° Faht. contain—

At the sea level,			7·147	grains of	oxygen.
„	500 feet above sea level,		7·01	„	„
„	1,000	„ „	6·87	„	„
„	2,000	„ „	6·61	„	„
„	3,000	„ „	6·38	„	„
„	4,000	„ „	6·18	„	„
„	5,000	„ „	5·90	„	„

Supposing these figures to be correct, and *assuming* that the same number of cubic inches of air per 24 hours are respired by the same individual at each altitude (which is questionable), and that 30 oz. avoirdupois is the weight of oxygen consumed in 24 hours by such an individual at the sea level, the following results are obtained by calculation :—

Ounces (Avoirdupois) of Oxygen consumed in 24 hours.	Grains of Oxygen per 100 cubic inches of dry air, 32° Faht.	Altitude.
30	7·147	Sea level.
29·4249	7·01	500 feet above sea level.
28·8372	6·87	1,000 „ „
27·7459	6·61	2,000 „ „
26·7804	6·38	3,000 „ „
25·9409	6·18	4,000 „ „
26·7656	5·90	5,000 „ „

It will be observed that, according to these calculations, the average diminution in the weight of oxygen consumed is about 1 oz. per 1,000 feet of elevation. See Appendix XIII.

[1] See "New Granada ; Twenty Months in the Andes." By J. F. Holton, M.A. Harper, Brothers, New York.

above the sea-level. San Paulo enjoys a dry, exhilarating atmosphere, bracing by comparison with that of the littoral regions.

Pacific slope of Tropical America—Guatemala, a city 5,000 feet above the sea-level; mean temp. 66 deg. Fahrenheit.

Alpine (rigorous)—St. Moritz, Upper Engadine, 6,100 feet above sea-level; Monte Generoso, 3,700 feet Bormio, 4,200 feet, for its elevation unusually sunny Tarasp, about the same height, in the Lower Engadine; Davos, 4,800 feet above the sea level.

Sea Voyages, or Living at Sea.

If downright bad climates be avoided, a long sea voyage, or a protracted cruise, is a remedial measure of real value. It will be especially likely to prove so when the patient is fond of the sea.

It is essential that the season for the voyage should be well chosen, that the vessel be freely ventilated below, and thoroughly well-provisioned, and that dangerously stormy, and rawly cold latitudes be absolutely shunned (Walshe).

It is to be extremely regretted that the well-devised scheme of Captain Grey for a winter cruise in southern latitudes (1869) was obliged to be abandoned, just as it was ripe for execution, in consequence of the number of passages taken not being sufficient to make the undertaking pay. I still hope that so good an idea will be successfully carried out some other year; and in order that it may not be lost sight of, I put on record the following copy of Captain Grey's prospectus:—

Cruise to Southern Latitudes during the Winter Months.

(*From the* 15*th October*, 1869, *to the* 15*th May* 1870.)

The frigate-built ship "Beatrice" (1,300 tons register), is appointed to leave London about the 15th of October, on a cruise in the North and South Atlantic Oceans, from 30° N. to 33° S. latitudes. The winds between these parallels prevail from the N.E. quarter in the northern, and from the S.E. quarter in the southern hemisphere, and are known as the Trade-Winds. The climate is the most beautiful in the world. A lovely blue sky, seldom covered with more than a few fleecy clouds, prevails from day to day, yet the temperature rarely exceeds 75°, the sun's rays being tempered by steady breezes. As gales hardly ever blow, the waves seldom rise to any height. The highest medical authorities—the "Lancet," and other journals—recommend the cruise as the best and most economical means of avoiding the winter, and of recruiting health and strength. Within the influence of the Trade-winds are the Canary Islands (Teneriffa, Canaria, Palma, Lanzarote), the Cape de Verde Islands, Ascension, St. Helena, Pernambuco, Bahia, Rio de Janeiro, and other places.

The ship will visit and stay at the following places of interest at about the times named:—

1. Gibraltar	about the	10th of November.
2. Madeira	„	30th of November.
3. Teneriffe	„	20th of December.
(Stay over Christmas Day.)		
4. Cape de Verde Islands	„	1st of January.
5. Bahia	„	22nd of January.
6. Rio	„	1st of February.
7 Cape Town	„	1st of March.
8. St. Helena	„	15th of March.
9. Ascension	„	10th of April.
10. St. Michael's	„	1st of May.

And return to Southampton about the 15th of May.

The principal cruising ground will be between St. Helena and Ascension to the East, and Rio and Pernambuco to the West; thus the great highway of all outward and homeward-bound vessels will be crossed.

Pleasure expeditions to the interior of the different islands will be arranged during the ship's stay in port; there will be also plenty of sport, fishing and shooting, and famous opportunities for making

collections of plants, ferns, &c.; in fact, nothing will be wanting to make the cruise a thoroughly enjoyable one.

Before leaving England arrangements will be made for forwarding letters and newspapers to the different places, according to the dates named as above, so that a regular intercourse with friends at home may be maintained.

The ship will be fitted up in first-class yacht style, as follows :—

The Dining Saloon ... 64 feet long by 18 feet wide.
The Ladies' Saloon ... 60 feet long by 18 feet wide.
The Gentlemen's Smoking Saloon, with Bagatelle Table.

The private cabins are fitted with all requisites, bathrooms, chests of drawers, &c. A select library, a grand piano, and harmonium will be on board.

A first-class and liberal table; wines of great variety will be provided. (Passengers may live on board while the ship is in port abroad.) A plentiful supply of water will be allowed, and ice in warm weather.

The officers and crew will be selected from the best men of the Royal Naval Reserve, and will be under the same strict discipline as on board Her Majesty's ships. The ship will carry a small armament, fly the Royal Naval Reserve flag (the blue ensign), and be commanded by Captain Grey, R.N.R.

Dr. Shirley is appointed medical officer, on the joint recommendation of Drs. Walshe and Dobell (London), and Dr. Paget, (Cambridge).

The party is guaranteed to be quite select, and not to exceed forty.

Charges for seven months (which include wines, spirits, &c., free at table and at stated hours, all medical attendance, cabin furniture, excepting bed linen and blankets, living on board whilst in port abroad, &c. :—

For one lady or gentleman	£210
For a whole cabin	£250
For a married couple	£350

Servants according to agreement.

APPENDIX.

I.—Form of Enquiry into the History of Winter Cough.

Breathing.	When did the breath first begin to be short on going up stairs or hills?
	In what other way were you ill when the breath first began to be short?
	What sort of health had you before the breath began to be short?
	Since your breathing first became short, has it ever been otherwise than short? If so, when?
	What do you think most inclined to make your breathing short?
Cough.	When did you first have an attack of cough?
	What sort of attack was it?
	What else was the matter at the time?
	How often and when have such attacks returned?
	How has the breath been between the attacks of cough?
	Have you ever been quite free from cough since the first attack? If so, when?
	When you catch a cold, does it affect first the chest, the throat, or the nose?
	Describe the symptoms of the attacks of cold which leave a cough?
	What gives you cold most easily?
	What gives you cold most often?
	Is your cough much worse at times from any other causes than fresh cold?
Past History, &c.	What illnesses have you had within memory not already stated?
	Do you attribute your complaint in the chest to either of those illnesses?
	If you do, to which do you attribute it, and what reason have you for doing so?
	If your mother is living, ask her these questions, and state what she thinks.
	If your mother is living, ask her whether you were a strong and healthy, or a weak and delicate child, and give her answer.

Family History.

Mother.—If living, what age and what health?

If dead, what age at death, and the cause of death?

What health had she during life?

Father.—If living, what age and what health?

If dead, what age at death, and the cause of death?

What health had he during life?

Brothers.—How many living?

What are their ages, and what health have they?

How many dead?

What were their ages, and the causes of death?

What health had they in life?

Sisters.—How many living?

What are their ages, and what health have they?

How many dead?

What were their ages, and the causes of death?

What health had they in life?

Occupation.

What is your present occupation, and how long have you followed it?

What other occupation have you followed, and at what periods?

What are your hours for business and for meals?

In what sort of place do you live by day?

In what sort of place do you live by night?

Diet, Habits, &c.

Do you take meat, and vegetables, and bread?

Have you always done so?

What fermented liquors do you drink, and what quantity per day?

Have you always taken the same?

Do you live regularly, and are your spirits usually good or bad?

Do you smoke?

How long have you done so?

Has it had any effect on your complaint?

Has anything you do any effect on your complaint, and if so, what?

II.—COUGH. ("Medical Press and Circular," *August 12th*, 1874.)

Some new experiments on cough are related in *Virchow's Archives*, by Dr. O. Kohts, of Strasburg. The first experiments of a scientific character on cough were made by Krimer, 1819. He considered cough as caused principally by irritation of the pneumogastric nerves. Afterwards Budge asserted that only primary cough was generated in the larynx. Then Truveilhier caused cough by irritation of the pneumogastric, which observation was confirmed by Romberg and Budge. After this Rosenthal concluded from experiments, that irritation of the superior laryngeal nerve is the frequent cause of cough. Recent experiments published by Nothnagel indicate that irritation of the membrane of the trachea and bronchi causes cough, and that not only the superior laryngeal nerve, but also other fibres of the pneumogastric, are apt, when irritated, to call forth cough,

Clinical observations led Dr. Kohts to the belief that the physiological experiments on cough are not concluded. He, therefore, made a series of experiments with dogs and cats, without the application of narcotising substances. The cough was originated by mechanical, chemical, thermical (ice), or electrical irritation.

His results are given by the *Detroit Review* as follows :—

1. *Larynx.*—By former experiments it is already proved that cough may be called forth by irritation of the larynx. The free margin of the vocal cords did not prove to be irritable. The inter-arytenoid fossa was very sensitive, and likewise irritation of the glosso-epiglottic plica and the ary-epiglottic plicæ caused cough.

2. *Parenchyma of the Lungs.*—The author could not decide the question, if irritation of the parenchyma and the alveolæ causes cough or not.

3. *Trachea and Bronchi.*—There was scarcely any doubt that cough arises from the irritation of the mucous membrane of these organs. Irritation on the place of bifurcation acts most powerfully.

4. *Pleura.*—Clinical observations speak for the appearance of cough in many cases of simple pleuritis. The same is proved by the author's experiments. Cough could be called forth with ease by irritation near the root of the lungs. Sometimes he applied ice, sometimes tincture of iodine or simple pressure, for this purpose. Irritation of the pleura costalis produced cough, but irritation of the pleura pulmonalis did not.

5. *Pericardium.*—Though pathological observations are in favour of the view that irritation of the pericardium produces cough, experiments failed to support it.

6. *Pharynx.*—In most cases irritation of its mucous membrane produced cough.

7. *Œsophagus and Stomach.*—Cough of a more croupous character was caused by pulling and pinching of the œsophagus, and by electrical irritation of the same. Simple irritation of its mucous membrane was ineffectual. Experiments on the stomach had only negative results. But there is no doubt that sometimes there will be noticed cough originated by irritation of the pneumogastric; for instance, when worms are present in the stomach or duodenum, or in cases of cancer of the stomach.

8. *Pneumogastric, Superior Laryngeal, Recurrent, Pharyngea Nerves.*—Mechanical irritation of these nerves, except the recurrent, caused in all cases cough. Experiments with the recurrent had only negative results. When the author cut through the pneumogastric of one side, and then irritated the bronchi and pleura of the same side, he observed cough after a while. This proves a connection of fibres between both pneumogastric nerves.

9. *Central Cough.*—As some authorities consider the observations made in this respect as not decisive, the author thought it necessary to experiment on the central organs. He found that mechanical as well as electrical irritation of the cerebellum and medulla oblongata originated cough.

10. *Centre of Cough.*—Based upon his experiments, the author thinks that this centre lies a little higher than that for the muscles of inspiration.

III.—CATARRHUS ÆSTIVUS; Hay, Rose, or Peach Cold, or Asthma. By W. C. Roberts, M.D., Vice-President N. Y. Academy of Medicine. ("The New York Medical Gazette," *October 8th*, 1870.)

Permit me to offer a few remarks, in season, from my own unhappy experience on this subject, about which little has been said and written, and which, of all the minor ills to which flesh is heir, is, perhaps, one of the most annoying—which to be fully appreciated must be suffered.

This abominable disease, which is known variously by all the above titles, comes on yearly at the same period of the year, but differing in different individuals. In some it occurs in May, in some in June, or July. But the real Simon Pure,

the true catarrhus æstivus, from which I have suffered annually for forty years, in a greater or less degree, without ever once wholly escaping its visitation, comes on in the latter end of August. Sweating as I do so profusely all through the summer months, and until then freely exposing myself to draughts without the slightest inconvenience, and rarely catching or suffering from colds at any other time, winter or summer—no sooner do the nights in August begin to grow chilly, and my relaxed cutaneous surface and sudoriferous tubes become refrigerated and contracted, say about the 20th, than my eyes begin to itch and stream, my nose to run and "crow like chanticleer," and my lungs to heave and whistle like those of a broken-winded horse. I become the victim of a "crying cold," which I well know is to last me for certainly one month, or more, with little or no abatement; with slight temporary remissions only, which, if I were not taught by long experience to know that they are fallacious, might raise in me delusive hopes of amendment. But in the very midst of my self-congratulations, after a few hours of comparative ease, some little imp, straight from Tartarus, plunges into the inner canthus of my eyes a white-hot needle, and tickles my nostrils; instantly they become suffused with scalding tears, which deluge my spectacles: a dozen or more noisy sneezes follow each other in rapid, apparently ceaseless, succession; a profuse sweat follows; streams of clear mucous flow from my nostrils, and drop upon the book or paper, and half-a-dozen handkerchiefs are at once called into requisition; an interval, more or less long, then occurs, after which the paroxysm is repeated; and so it goes on, day after day, and hour after hour, until the disease has run its appointed course and subsides, like a partnership, by its own limitation. During all this time, weak and rather sore eyes, an itching, running nose, stuffing of the nasal passages, occasional violent fits of sneezing; head-ache; weariness and indolence of mind and body; a general feeling of good-for-nothing-ness; distaste of and unfitness for society, and an inability to look people in the face; cough and asthmatic wheezings, and a cold and clammy moisture, are the concomitants of my unhappy condition. Draughts of air are intolerable, and increase my catarrh; the very waving of a fan annoys me: and such is the susceptibility of my skin, that the application of a cold, wet part of a soiled handkerchief to my face, irritates me. Another petty misery is the excessive coldness of the end of my nose, sensible to myself and to others, who are kind enough always to inform me that it is like a dog's. I have not seen this symptom, which I look upon as *the* pathognomic

one, mentioned by others, and I desire to have due credit awarded me for the discovery. It is amazing with what suddenness and rapidity the congestion of the Schneiderian membrane occurs—sometimes on one side, sometimes on the other: a little itching in the nostrils, and, presto ! the sneezing begins, the stream issues, and the eyes follow suit. It is needless to say that I am never without a handkerchief to my nose, and two or three in my pockets, and that I relay them, as postillions do their horses, spreading one out to dry while the other is in use. Light does not annoy me, *per se*, as it does the wife of one of my *confrères*, a fellow-sufferer, who has a true photophobia, and has to have the room darkened; and in this respect I should do well enough, were it not for the weeping and irritability of my eyes, which keeps me wiping them constantly, winking and blinking like a cat in the sun. But my cross in life is DUST: I print it in capitals. So surely as I go out at mid-day into one of our large thoroughfares which has not been recently watered, or ride in a dusty railroad car, etc., does every floating particle of dust make straight for my *canthi*, with the effect of a grain of cayenne pepper, and for the rest of that day, closed itching eyes, a darkened room, snuffing and sneezing, and an irritable temper, are my portion. I pray for rain with all the fervour of the old Scotch clergyman, without caring whether or not it should eventuate in a deluge.

If, in my walks, I see men sweeping a street, and clouds of dust arising, I shun it as I would a rattlesnake; and if I see a building in process of demolition, I go a block out of the way to avoid it. I always walk on the shady side of the street if there is one, and select a well watered street if possible, or keep well to windward. I cannot begin to express the agony which on certain occasions of my life I have suffered from this cause, and, therefore, I confine myself within doors as much as possible. Dust and draughts are my particular aversions. I could not smell a rose, or eat a peach unpeeled, the hairs of which irritate my fauces; (and by the way, I now bethink me, that my catarrh does come in peach time, which may have something to do with it), nor inhale ipecac.; and snuff, I believe, would make me sneeze my head off. Nothing that I have ever snuffed up my nostrils has failed to injure me. I once suffered almost suffocation from an astringent injection prepared for me by a druggist friend.

Dr. Elliotson, in his lectures on this disease, (*Lond. Med. Gaz.*) describes it admirably in a few words, as a combination of catarrh and asthma. "It consists in excessive irritation

of the eyes and nose; much sneezing occurring in paroxysms, with a copious defluxion from the nostrils; pricking sensations in the throat; cough, and tightness in the chest, and difficulty of breathing, with or without considerable mucous expectoration.' In me the dyspnœa and asthmatic sonorous and sibilant rales succeed to a paroxysm of coughing, and the expectoration gives relief. I have a little of it at all times, however. But Dr. E. says that it occurs in May and June, when the grass comes into blossom, or when haymaking is going on. Mine never occurs at this season, and hay never affects me, not even, as far as I know, when my cold was at its worst. Were I to inhale its dust or fine particles, it would, no doubt, irritate my nostrils. The worst attack I ever had was in 1839, at West Point, where there was neither hay nor peaches. Hay is always passing through the streets, and I often meet with it, and I lived several years on the directly opposite corner to one of the largest livery stables in the city, where they were constantly taking it in, and it never affected me. If hay were a frequent cause, it would be a more common disease. But its effects on some, from the recorded cases, are indubitable. Watson mentions that an English duke had just left London for Brighton, to escape Hay Fever. I do not believe that (Aitken and Wood not excepted) there is a better compendium of Theory and Practice of Medicine than Dunglison's in our language. If no very recent edition has been published, it may now need some additions; but it is thoroughly posted up to the date of its publication, and it is the work of a scientific and practical man. I always find what I want in it. In an article on summer bronchitis, he gives two letters from men who thoroughly appreciated the suffering caused by the disease. One is to Dr. Elliotson; but it *is* Hay Fever. It begins with him, he says, at the latter end of May, with great itching of the eyelids, *particularly at the inner canthi;* with sneezing of a violent kind, often recurring eight or ten times; with copious defluxion from the nostrils, at certain periods of the day, in the intervals of which he has no catarrhal symptoms. I am never entirely without them, and have them now (Sept. 22) as I write. This comfortless state, the Dr. writes, continues five or six weeks, and does not interrupt his employments, though he is best in the house. He went, he says, for an hour or two into a friend's hay field with some ladies; but he was glad to get into a corner, where his streamy eyes and nostrils, and noisy sternutations, might escape both remark and commiseration. The other letter is from a Baltimore gentleman affected from the middle of July to October. His

affection was mainly of the head, which he could arrest by inhaling laudanum, but with so distressing an effect that he was glad to bring it on again by snuff; the remedy, I should say, being worse than the disease. Fatigue, exposure and excitement all aggravated him; moderation, quiet, *comfortable diet*, the sofa and bed, suited him best. The dripping from the nostrils was, in the season, almost ceaseless. It is, he says, a mighty trial of faith, patience, and good nature; and were he on a jury to try a man for murder, who could prove that he had been afflicted at the time with this catarrh, he should suspect him the more grievously, but deal with him more leniently. I verily believe that a man with hay fever may do many things for which he should not be held to too strict an accountability."

"And now, if it is not *Hay* Fever, of which we favoured few of the *Augustan* era are the victims, what is it? It is evidently a nervous affection, and we possess a peculiar idiosyncrasy; an irritability on the part of our Schneiderian membrane, which causes us to be affected either by atmospheric conditions, or floating emanations, or particles in the air, of whatsoever kind they may be—those from a guinea pig or rabbit, if you please—as others are not; and by which, only at certain seasons, we are affected. The whole thing, I believe, may be summed up in this one word, Idiosyncrasy—a peculiar liability to certain bodily or mental impressions.

"By the way, if the reflection could afford us any consolation, the disease is not a common one, nor met with in the *plebs*, the *commune vulgus*, the *oi polloi*, but is patrician and aristocratic, and met with mainly among those high in rank and social position, and eminent for mental and literary attainments. William IV. of England; an English duke; Southey, the poet; several learned divines, lawyers, medical men and their wives, ex-mayors, bankers and ladies of fashion, are among the select few upon whom it bestows its favours. The great Daniel Webster secluded himself every autumn at Marshfield, to get through his season of trial with what patience he could muster; and the distinguished Henry Ward Beecher annually vacates his pulpit for a season from the same cause, and certainly, if ever a clergyman had a good excuse for so doing, it is he. Preaching, even such as his, would fail of its effect, if interrupted at intervals by a succession of sonorous sneezes, paroxysms of cough, and asthmatic utterance, and a persistent aspersion of eyes and nostrils. How he bears it, I do not know; doubtless more resignedly than a mere M.D.;

but if so, it is greatly to his credit, for, as the Baltimore gentleman observes, it is a great trial of faith and patience, religion and philosophy; and enough, at times, as my lamented brother-in-law, Dr. Gilman, was wont to say, 'to make a man curse his mother and turn Turk,' if that be the *ultima thule* of human turpitude. The man who could at all times bear with equanimity the annoyances of hay fever, would rival the fortitude of Guatimozin himself, who, when stretched upon live coals by his brutal conquerors, rebuked the complainings of his fellow-sufferer, by gently reminding him that 'he, too, was not upon a bed of roses.' The very fact of the rarity of the disease as contrasted with the universal infectiousness of epidemic influenza, and our being free, at all other times, from the ordinary effects of exposure to weather, etc., shows that there exists between us and the causes of the disease some mysterious connection. I have attributed my attacks solely, so far, to the refrigerating influences of the chilly autumn evenings on my relaxed cutaneous surface, but why is it that I am at no other time subject to similar influences, or very slightly so, and whence do I derive, at this particular season, this extraordinary susceptibility and irritability, which I share with others, of my lachrymal and nasal mucous membrame, differing so much from that of ordinary catarrh at other times?

"Respecting the treatment, little is to be said. Local applications are more harmful than beneficial. Bathing the eyes in warm water, with a little salt in it, I think, gives one relief. The Baltimore gentleman thinks tepid bathing aggravates the complaint, and so should I, as tending to increase the liability to diaphoresis. He says: 'The prussic acid with black drop, three times a day, in small doses, has generally been useful;' 'Rowland's Tonic Mixture is palliative.' 'I am convinced,' he says, 'that it *ought not to be cured*, and Dr. Physick, of Philadelphia, told me he had utterly failed in the several cases that had come under his care. I have tried countless remedies, regular and irregular, and nothing cured. Some things aggravate; few mitigate.' Gordon recommends cold shower bathing, and quinine and iron, as *preservative against attack*. There is a lady in this city, who, I am told, shuts herself up in her house, and takes quinine and arsenic, and escapes. Some ascend the White Mountains, or go to the sea-shore, or take a sea voyage, in advance, or on its approach, with advantage. Among these is my friend, Dr. Sands, who, reversing the maxim '*venienti occurrite morbo*,' flees from it annually with success. This is prudent, but not magnanimous, and is not within the pecuniary means of all.

I have never done much for mine. Nothing I ever did do did me any good; and I am so firm a believer in the specific nature of certain diseases, that, until the cause ceases, I believe the disease will continue in spite of physic (which I am not fond of taking), and must be endured. Elliotson directed a gentleman to sprinkle chlorinated soda about his apartment and smell of it, with a satisfactory result. Tinct. lobelia and strong coffee have been favourably spoken of. I am pretty certain that ale and alcoholic stimulants should be avoided, the diet be light, and that the patient should keep in-doors as much as possible, and avoid perspiration, draughts, strong lights, and night-air, and dust especially. Let him change the air and scene, if he can; and if he can employ himself actively in some enforced occupation, and forget himself and his complaint for a time, it will be greatly to his advantage. I know that on two occasions of my life, this has been in a great measure successful. The affection wears itself out in time, and the remedy last used, especially if about this period, will get the credit of a cure.

"Now that the days are getting equably cool (Sept. 23rd), and I perspire less, I am getting better, although some catarrhal symptoms still remain, and I shall soon recover in toto from a comparatively mild attack, if I can, indeed, avoid sweating, chills, and dust, a little longer. I think the disease, with each successive year, abates in duration and severity. One word more as to treatment. It is strange that opium acts so differently on different people; in some proving a God-send, and in others, especially in females, a poison. An opium dragée puts me into a quiet sleep and gentle perspiration for the whole night, without unpleasant effects next morning. The effects of chloroform are very pleasant at the time, but the next day I have headache and nausea, and loathe the smell of it, and cannot keep the bottle in the room. As the disease is clearly the result of nervous irritation, and occurs spasmodically and paroxysmally, tonics, (iron and quinine), nervines (bromid. potass., valerianate of ammonia, assafœtida), and sedatives (opium hyosciamus, belladonna), ought, on theoretical grounds, to do good; are indicated, and might be tried, together with hygienic means. I cannot see that antiperiodics are especially indicated. If there were any truth in the *similia similibus* doctrine, and any virtue in infinitesimal doses, hydriodate of potass. ought to prove certainly efficacious; for, once in my life, and only that once, I saw it produce in a man as bad a 'crying cold' as I ever had at any period of my autumn catarrh.

"I believe that the less a man drinks of anything, hot or

cold, the better, and that the dry treatment of Dr. Williams in coryza (total abstinence from every kind of drink, as far as possible while the disease lasts), with other indicated precautions, might be adopted with benefit. It cuts off the supply of watery materials to the blood. I am sure the less I drink, the less I perspire, which I dread so much and do so freely; and I am thrown into a free state of perspiration equally by a cup of warm tea, or a tumbler of iced-water; and I have not observed that either hunger or thirst was at all urgent. Drink, then, I say, as little as possible; sweat as little as possible, if going about your business, and avoid getting chilled when you are sweating. I do not believe that lying a-bed to perspire would hasten the cure, and the subsequent risk of aggravation would be greater, at any rate. All could not spare the time it would require, nor submit to the regimen. Keeping the room, or house, as much as possible, I believe in, and indeed there is little inclination to do otherwise.

"I do not intend this article as a grave and *ex cathedra* essay on *Catarrhus Æstivus;* but rather, as most of the other contributions to the subject have been a 'plain, unvarnished' statement of the personal experiences of an old sufferer, in which, if I have nothing extenuated, I have set down naught of intentional exaggeration. Whether I shall be laughed at, or sympathized with, I cannot tell; but I may say to those who 'jest at scars, that never felt a wound,' that nothing is easier than to endure another man's sufferings; to see another man whipped, and amuse yourselves with his contortions and grimaces. But, as the title of Mr. Reade's novel says, 'Put yourselves in his place,' and the result might not prove quite as agreeable. Dennis, the hangman, was very facetious and consolatory to those upon whom he performed the duties of his office, but protested very strongly against himself being made the subject of the experiment. The literature of the disease is as yet, as far as I know, very limited. When Dr. Sands returned from England, some years ago, he brought with him some printed queries in relation to it for distribution, one of which, I think, I answered, from a gentleman in London, himself a sufferer, who was about to write a book upon the subject. Whether it ever saw the light I do not know. Dr. Vandervoort, Librarian of the New York Hospital, informs me that some papers relating to it have been passing lately through the columns of the *Lancet*, which I shall take an early opportunity to inspect.

"I find great comfort from holding my handkerchief to my mouth and nose when riding, and I endorse Dr. Watson's

suggestion, to try the Respirator, 'as a defence against the volatile exciting cause of Hay Asthma, whatever it may be.''

"London Medical Record," *August 19th*, 1874.

"Dobell on a New Remedy for Hay Fever and Sneezing.—Dr. Horace Dobell writes thus in the *Pharmaceutical Journal* of June 27:—

"At this season of the year, when 'sneezers' and sufferers from 'hay fever' are in the depths of their miseries, it is merciful to make public any reasonable suggestion for their relief. I have, therefore, much pleasure in being able to bring forward a little contrivance and a prescription, by the combined use of which immense comfort may be given to many sufferers.

The prescription is as follows:—

Chloral hydrate and camphor (of each)	16	grains.
Carbolic acid	20	,,
Pure morphia	12	,,
Oleic acid (enough to dissolve the morphia)	20	,,
Castor oil (the clearest and finest)	7	drachms.

Rub well together to make a lotion.*

"The 'contrivance' is for the efficient application of the above remedy, and consists of a miniature bottle contained in a little box-wood case, so that it can be carried easily in the pocket. To the lid of the box is attached the cork of the bottle, and to the cork, in the same fashion as the spoon of a cayenne-pepper cruet, is fixed a little club-shaped rod of polished ivory, long enough to reach to the bottom of the bottle, and also to the upper extremity of the nostril. The little bottle is kept half full of the lotion above prescribed, and the little rod immersed in it. Directly the patient feels the tickle or other signal of a coming sneeze, he uncorks his bottle, withdraws the ivory club, wet with the oleaginous lotion, and gently pushes it up the nostril till it reaches the seat of the sneeze-signal; there it should be gently pressed, so as to apply the lotion to the part. After this the club is withdrawn and returned to its little bottle of fluid, where it becomes at once charged for a fresh application. As often as the sneeze threatens, the operation should be repeated. Very often one application will keep off a threatened *fit* of sneezing altogether, even though its first effect may be to excite a sneeze.

"I have requested Messrs. Savory and Moore to keep this

* "As different perfumes affect different patients peculiarly, no scent is added in this formula; but anyone who prefers it, may have it scented by the addition of whatever perfume is known to suit best."

little appliance ready-made and charged with the lotion, so that it can be sent by post without difficulty or delay. It has been of so much comfort in cases within my own practice, that I am sure it is worth while for any one who has not yet found a remedy to give it a trial.

"In cases accompanied by much throat-irritation, it is advisable to combine with this treatment the use of the 'Lozenges for Postnasal Catarrh,' prepared from a prescription formerly published by me (*On Winter Cough*, etc., 3rd edition, p. 211), and always kept ready-made by Bell, Savory, Squire, Corbyn, Hanbury, and other leading chemists.

"I may add that when there is great prostration, and a tonic is required, tincture of eucalyptus globulus will sometimes answer better than quinine, especially if there is much feverishness.

"None of these remedies should be used without consulting the doctor in attendance on the case."

IV.—THE FUNCTION OF THE UVULA (Dr. Dobell, "British Medical Journal," *Sept.* 5, 1874).

"Looking, to-day, into the pharynx of a patient suffering from a severe nasal catarrh, I saw the watery secretions from the back of the nose pouring down in a continuous stream from the tip of the uvula on to the dorsum of the tongue. It was evident that they were collected to this point from all the surrounding parts, and that the uvula acted as a conduit to bring them to the front of the epiglottis, whence they might be safely carried down the throat by repeated acts of deglutition; whereas, but for the uvula, they would be liable to drip behind the epiglottis, and thus cause constant discomfort by getting into the larynx. This very simple but important function of the uvula has not, so far as I am aware, been noticed before, notwithstanding all that has been written about this odd little organ."

V.—ON THUMB-SUCKING (Dr. Dobell, "British Medical Journal," *November 8th*, 1873).

"I have observed that a peculiar and rather common deformity of the chest is caused by the habit of sucking the thumb in infancy and early childhood. The weight of the arm on the thorax of the child during sleep produces depression of the ribs on the line occupied by the arm when the thumb is placed in the mouth. As this is a very important effect of 'thumb-sucking' never hitherto pointed out, I think it desirable to place this note on record for the benefit of other observers."

VI.—VERY INTRACTABLE AND CHRONIC CASE OF SPASMODIC ASTHMA AND BRONCHIAL CONGESTION,

(*As related by the Patient*).

"At about 8 years of age, I got a cough which could not be accounted for; I remember a doctor making me run up and down stairs, and then saying nothing was wrong with my breathing. After a few years, a great wheezing came, often during my sleep, then I came to not being able to take any exercise, as a general rule, after five or six o'clock, without difficulty of breathing coming on, which was always worse during summer months. Then frequent spasmodic attacks came, until I was about 20 years of age. Many things were tried in vain, such as leeches on my stomach, strong emetics, irritants on my back and chest. On going, at that time, into Devonshire for a summer, I suffered intensely, the spasms recurring every couple of days, and lasting twenty-four hours, and after an interval of about twelve hours another attack coming on. Many doctors were consulted; one suggested inhaling ether; another, large doses of morphia; another, tartar emetic ointment on the spine; from all of which I suffered greatly, and got no relief. I was then advised to try coffee (not boiled), but made by pouring a very little boiling water on a large quantity of coffee; this acted like a charm, and for twenty years at least seldom failed, if taken in time, BEFORE the spasm came on, also before eating. I was very subject during all those years to bad colds, commencing in my head and going into my chest, ending with severe cough. After each attack of cold I was free from asthma, sometimes a week, other times many weeks, or as long as the cough lasted; but it invariably came on afterwards. I then became subject to more severe attacks of illness; first pleurisy, then two severe attacks of congestion and inflammation of my right lung, at intervals of about from two years to three; during which illnesses I expectorated large quantities of clear mucus, and was always free from asthma afterwards, at one time for as long as three or four months. The hours for the spasm to come on were for many years about four o'clock in the afternoon, or half-past two o'clock at night; and I have often after a violent spasm, when relieved by coffee (which would take effect in an hour or more), been able to sing or run up and down stairs without the slightest feeling of inconvenience.

"The following is a list of the principal remedies prescribed at different times, and I have noted the effect against each :—

Espic Cigarettes	bad.
Datura Tatula Cigarettes	bad.
Pariss's Cigarettes pulmoniques	very bad.
De Joy's Cigarettes	no good.
Nitre Paper	no good.
Papier Fruneau	some good.
Martindale's Pastilles,	no good.
Fumes of burning Resin	no good.
Inhalation of Chloroform	no good.
Stramonium smoked and inhaled	harm.
Inhalation of Ether	harm.
Sulphur Emanations from Baths at Harrogate	some good.
Turkish baths	no good.
Galvanism	no good.
Electricity,	no good.
Dr. Palmer's (Dublin) Anti-Asthmatic Papers	*great relief.*
Strong Coffee.	*great relief.**

"These two remedies are the only ones upon which I have been able to rely for years." (See note, p. 194.)

When this case came under my notice, both the Coffee and Dr. Palmer's Papers had, for some time past, been gradually losing their beneficial effects, and had at last become nearly useless. This I considered to be due to the serious increase of bronchial congestion, which had evidently been steadily taking place for many months. With this view, I put the patient under the influence of Antimony with Ammonia, followed by blisters and Aconite (see note, p. 191), with such signal success that after this the Coffee and Palmer's Papers recovered their former power over the asthmatic spasm. I may add also that all sorts of climates had been tried without finding one that was markedly beneficial. Happily there are not many cases so intractable as this !

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* "I have not attempted to enumerate the numerous internal remedies, including arsenic, quinine, iron, strychnia, etc., etc., which have been tried either with the effect of aggravating the asthma, or with no effect at all."

VII.—POULTICING BY STEAM; A NEW MEANS OF APPLYING EITHER MOIST OR DRY HEAT TO THE SURFACE OF THE BODY. BY HORACE DOBELL, M.D.

(*First exhibited June 4th, 1874, at 84, Harley Street, and again at the Meeting of the British Medical Association in Norwich.*)

AT a Meeting of the Abernethian Society of St. Bartholomew's Hospital, February 10th, 1853, I introduced the use of vulcanized rubber bags, filled with *hot water*, as a "new means of applying heat, and of maintaining the temperature of warm applications," and the suggestion has been followed to a considerable extent in the use of hot-water bags, as foot-warmers, stomach-warmers, and the like; but the difficulty of preventing the water from accumulating in one part of the bag by gravitation, and (when this is prevented by septa and by completely filling the bag) the *great weight* of the water, have presented hitherto insuperable objections to the general use of large hot-water poultices, which in all other respects offer so many advantages.*

In the treatment of Bronchitis, Pneumonia, Peritonitis, Phlebitis, and all other inflammatory affections *occupying large areas*, when it is desired to employ equable warmth for protracted periods, the difficulty of doing so in a satisfactory manner is only too familiar to all practical physicians and surgeons.

This difficulty I have now removed by an important modification of my original design, viz., *the employment of Steam instead of Water*, thereby getting rid of all the objections which prevented the complete success of my suggestion in 1853.

The objects aimed at by poulticing, and the difficulties to be overcome, are fully detailed in the following paper, and it will be observed that poulticing by steam not only answers all the conditions laid down as essential to success, but adds to them the very great advantage of *lightness*.

Paper read before the Abernethian Society of St. Bartholomew's Hospital, February 10th, 1853, referred to p. 250.

ON A NEW MEANS OF APPLYING EXTERNAL HEAT, AND OF MAINTAINING THE TEMPERATURE OF WARM APPLICATIONS.

MY attention has been particularly called to this sub-

* When the part to be poulticed can be placed *upon* the hot water bag, it answers perfectly.

ject by happening to have under my care, within a few months, an unusual number of cases in which warm poultices and fomentations formed a prominent part of the treatment.

The inconveniences and disadvantages common to all the present modes of poulticing, which have probably annoyed most medical men at different times, may be briefly enumerated as follows :—

The First, and most obvious, is the impossibility of keeping up the heat of the poultice for any considerable length of time.

The Second follows as a necessary consequence of the first, viz., the poultice must be applied at a much higher temperature than is consistent with the object in view, in order to provide against its becoming cold too soon.

The Third objection to ordinary poultices is the difficulty—I think I may say, the impossibility—of ensuring an equal diffusion of the same temperature throughout the whole extent of the application.

Fourthly, the frequency with which the dressing requires to be removed entails an equally frequent disturbance and exposure of the part.

Fifthly, the insufficient extent of the application. This it would seem is not absolutely unavoidable; but, at least in private practice, it is so difficult to get it remedied, that it becomes a very serious evil. The poultices are generally made to agree in size with that of the part most severely affected, and are therefore too small to answer the most important of the objects with which they are applied.

Although poultices and fomentations are employed much less frequently in the present day than they were formerly, yet, with proper precautions in their application, I think few will doubt that they form a very useful item in the treatment of many diseases. That they are very extensively employed, is readily seen in the wards of this or of any other large hospital. I hope, therefore, that the Society will not think I am wasting its time by calling attention to a subject too often consigned to the judgment of nurses.

In order to appreciate the room for improvement in the matter before us, it is necessary to glance at the rationale of the treatment, and the objects to be gained by its application. I beg, therefore, to say a few words on these practical points. The greater number of cases in which poultices and fomentations are employed may be included under the head of *Inflammation;* we will therefore consider them first. The application of external warmth to an inflamed part, may have one of two

principal objects. To encourage what has been called "resolution," or to promote suppuration; and I wish to point out, that according as the one or the other of these ends is desired, the mode in which heat is applied should be different, which will be made self-evident by a slight review of the process by which inflammation advances in a tissue.

It is not necessary to our present purpose to enter far into the debateable details of the physiology of inflammation; it is almost entirely with one portion of the process that we are here concerned, viz., the changes in the vessels of an inflamed part and in the supply of blood which they convey. In restricting my observations to this part of the subject, I hope not to be misunderstood, for theories which attempt to explain a process like inflammation without taking into the consideration all the conditions of nutrition appear to me to be most unphilosophical. But, as the localized application of heat to the surface of the body has no important effect upon the state and composition of the blood, the normal state of the part in which nutrition is to be effected, or upon the supply of nervous force, we may confine ourselves to what concerns the *supply of blood to an inflamed part.* "We seem to have sufficient evidence," says Mr. Paget, "that in general, in the process of inflammation, blood is present in very large quantity, distending all the vessels, gorging them especially with red corpuscles, but often moving through them slowly, or even being in some of them quite stagnant, that all around this focus the vessels are as full, or nearly as full, as they are in it, but the blood moves in them with a quicker stream, or may pulsate in the arteries and oscillate in the veins; that yet further from the focus the blood moves rapidly through full but less turgid vessels, and that this rapidity and fulness are not to be ascribed merely to the blood, which should have gone through the inflamed part, being driven through collateral channels, but is such a state as is commonly understood as 'an active congestion,' or 'determination of blood' in the part." It is only by a clear perception of these conditions, and an equally distinct impression of the effect of local heat upon a healthy part, that we can form a correct opinion of the good and of the harm that may be done by its application in inflammation.

I have adopted the above details as given by Mr. Paget, because his views are founded upon a wide basis of facts in the physiology of warm-blooded animals, and as the best description of the effects of local heat. I must also refer to the account given by Mr. Paget of the *changes* which took place when a fine, red-hot needle was driven into the membrane of

a bat's wing. The first effect of such an injury (in addition to the charring and searing of the membrane, the obliteration of its blood-vessels and the puckering of the portion of it adjacent to the burn) is to produce contraction of the immediately adjacent arteries and veins. "They may remain closed, or after being long closed may again open and become wider than they were before. This dilatation follows more certainly and perhaps without any previous contraction, in the arteries and veins at a little distance from the burn. In these speedily ensues such a "determination of blood" as I have already described; in arteries and veins alike the stream is full and rapid, and the greater accumulation as well as the greater crowding of the red corpuscles makes the vessels appear very deeply coloured. Close by the burn, the blood which has been flowing rapidly begins to move more slowly, or with an uncertain stream, stopping or sometimes ebbing and then flowing on, but, on the whole becoming gradually slower. Thus it may, at length, become completely stagnated; and then in the vessels in which it is at rest it seems to diffuse and change its colour, so that its crowded corpuscles give the vessels a brilliant carmine appearance. As one surveys an area surrounding this part, in which the blood is stagnant or moves slowly, one sees the streams increasing gradually in rapidity, and often, when there is stagnation in a considerable artery, one may see the blood above or behind it pulsating with every action of the heart, driven up to the seat of stagnation, and there carried off by the collateral branches, while in the corresponding vein it may oscillate less regularly delaying till an accumulated force propels it forward, and, as it were, flushes the channel."

I need hardly point out that the description before given of the state of the circulation in an inflamed part is only an enumeration of similar phenomena to those witnessed in the experiment with the bat's-wing—in short, that the effect of the local application of heat is *inflammation* (depending in degree upon the height of the temperature), and upon this important fact turns the whole question as to the method in which the heat should be applied; for it is evident that if its local application is capable of producing inflammation, it may readily aggravate the disease instead of relieving it, when applied to an inflamed part.

We may then thus briefly express the rationale of warm applications in removing inflammation. By multiplying the points towards which the current of the circulation is attracted, the force of the stream is diverted from the original focus, and carried in so many different directions that finally all distinct

centres of attraction and stagnation are lost and merged into one equal and accelerated flow of blood, during which the circulation in the part is enabled to recover its natural balance; but it is necessary to the successful termination of these changes that the new centres of inflammation shall be set up, not only within the immediate focus of the original disease, but also at sufficient distances from this to be beyond the site of turgid vessels.

It has been seen that as the inflammation process advances the blood flows more and more slowly within the original focus, until, in one vessel after another, it becomes motionless: in proportion as this stagnation spreads and becomes more complete the amount of effusion and of damage to the tissues increases, and the prospect of a cure by resolution disappears.

It is this condition, therefore, that we anxiously hasten to prevent and to remove. But if at this eventful stage of the disease, we apply to the affected part a hot poultice of such small size that it only covers the inflammation region, and of a temperature high enough to exercise any decided influence, the effect can be no other than the aggravation of the exciting mischief by still further promoting the flow of blood towards the first centre of disease, and its accumulation within the original focus. In this way does it happen that we so often witness *suppuration* after the use of poultices instead of that gradual restoration to healthy circulation which the external application of heat was intended to promote.

I have dwelt thus fully on the importance of *extent* in poultices, because, although the personal attention of the surgeon to this point may ameliorate the evil, I think that nothing can remove it except an alteration in the means employed for maintaining the temperature of external applications. When we consider the composition of poultices, it becomes evident that, whatever their size and extent, in comparison with that of the inflamed part, they are still subject to the same objections already urged, for it is impossible to equalise the temperature throughout their whole area. The ingredients used in making poultices are all more or less porous—and to that extent bad conductors of heat: they are more or less solid—therefore the fault in conduction is not remedied by change of place among the particles. They are generally saturated with water—a very bad conductor—in which the equalising process of convection is prevented by the solid ingredients. There could hardly be a better contrivance for preventing the possibility of an equal temperature throughout the mass. Consequently the central or more strictly covered or more dense portion of the poultice, will

soon become the point at which the temperature culminates, and will, to that extent, act as a centre of attraction to the circulating blood.

An inflammation generally spreads in a tolerably equal manner round about the original centre of disease; therefore, this centre and that of any application will pretty closely coincide, and since, as a general rule, the loss of temperature in a poultice will proceed from the circumference, it follows that the greatest heat will be applied most frequently and most persistently upon the very part where it is least required, and the application will consequently have the same injurious effect as poultices of small extent—when the object is to promote *resolution*.

The second object in the local application of heat to an inflamed part may be here disposed of in a few words.

That which is aimed at in this case is the centralisation of the disease, not its dispersion. The objections urged against want of extent, and of equality of temperature, are here no longer valid; on the contrary, the poultices should be small, and confined to the original centre of the inflammation, for the very same reasons that they should not be small while there remains a hope of avoiding effusion and suppuration.

To return, then, to the primary object, viz., the removal of inflammation by resolution.—The conditions which appear to me to be essential to the efficient application of local heat with this intention may be thus summed up.

(*a.*) The heat should be *extensively* applied not confined to the inflamed part, but extending also to the surrounding healthy tissues.

(*b.*) The heat should be *equally* applied, there should be no point in the application at which the temperature culminates.

(*c.*) The heat should be *persistent;* the application should be so contrived that the temperature may be kept up for a considerable time.

(*d.*) The poultice or dressing should *not require frequent removal*, for it is often essential to the success of the treatment that the part shall remain at rest.

(*e.*) The *heat should be moderate.* The application should be of such a kind that it may not be necessary to apply it at a higher temperature than is consistent with the integrity of the tissues with which it comes in contact, and with the objects of treatment.

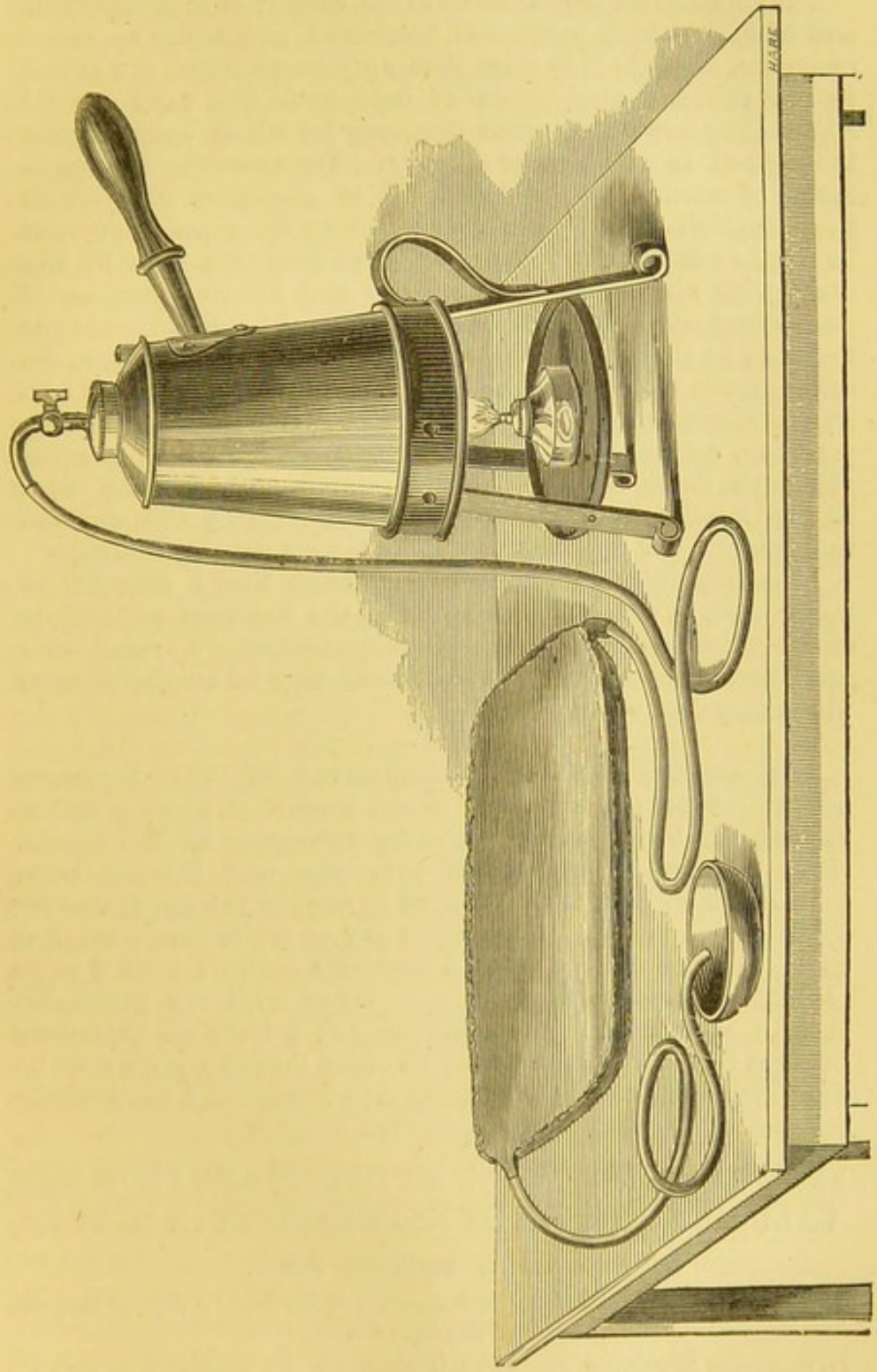
Nothing can be so suitable to these conditions as hot water, confined in a medium which shall prevent evaporation, and of slow powers of conduction. I therefore have

directed Mr. Furgusson to construct the appliances exhibited on the table to-night. These are bags of vulcanised rubber of different shapes to suit the various parts of the body for which they may be needed. The simplest of these is a flat bag or cushion, the walls of which are "reeded" to prevent over-distension; at either side an elastic tube is attached, by which the bag may be filled or emptied, and each is closed at its free extremity by a screw-cap and washer. This will of course be applicable to any flat surface of the body, as the abdomen or loins. A smaller bag of similar construction, but shaped somewhat like a bowl, is intended for the breast. Some are made double, forming a sort of sleeve through which may be thrust the arm or leg; in these, the upper and lower portions are divided by longitudinal septa on either side to prevent the pressure of the limb from forcing the water from below upwards, and each tube is connected with both divisions. Some are made in a similar manner, except that they are open at one end only, forming, as it were, a bag within a bag; they are intended for the hand or foot.

The elastic material of which these appliances are made will bear a very elevated temperature; the water, therefore, may be of any heat which is thought desirable; but since there can be no loss of temperature by evaporation, and as the vulcanised rubber is a very bad conductor of heat, the water will retain its temperature for a very long time, and therefore it need not be hotter when first introduced than is consistent with the objects of treatment: and when it has become cool, it may be drawn off, by simply unscrewing the cap from the tubes, and fresh may be introduced before the walls of the bag have lost their warmth. During the whole period of its employment the temperature, whether high or low, will be kept equal throughout the application by the process of convection.

Thus it is evident that, by appliances of this kind, external heat can be applied extensively, equally, persistently, without requiring frequent disturbance of the part, without the necessity of applying excessive heat at any one time. To these advantages are added others of no slight value, viz., that an equable *pressure* may be excited, if necessary, the degree of which may be increased or diminished simply by introducing more or less water; that a water-cushion is provided for the inflamed part; that the application is particularly cleanly; and, lastly, that while it enables us to make use of dry heat thus efficiently, it is perfectly consistent with the simultaneous employment of any kind of poultice or

dressing which may be thought necessary. Wet lint, or linseed-meal, or bread, may be applied next to the part, and



the hot water over it to retain the temperature. I have made an admirable poultice by wrapping a limb in cotton wool

wrung out of warm water, and then thrusting it into the sleeve-like bag.

I have confined my remarks to the subject of inflammation, and chiefly to that portion of treatment adopted to *encourage resolution*, because it is clear that appliances which are suited to the effective application of heat with this view can be adjusted to any of the other purposes for which local warmth is required in medicine or surgery. For example, the application of warmth to a sphacelated or paralysed limb—with the intention of restoring or sustaining the circulation—can be better effected by the means here proposed than by any other with which I am acquainted; and for the purpose of recovering and of maintaining the general temperature of the body, as in cases of cholera, of drowning, and the like, the same means may be carried to the extent of a hot-water bed. In the treatment of inflammation which is proceeding to suppuration, and in which it is desired to promote that process, although there is not, as before stated, any need for *extent* in the applications, the power of maintaining the elevated temperature for a length of time is a very great advantage.

In concluding, let me express a hope that I may not be understood to over-rate the value of the external application of heat in the treatment of inflammation. I have only attempted to show how that auxiliary may be employed most pleasantly and efficiently.

The construction and arrangement of the necessary appliances for poulticing by steam presented many practical difficulties, but with the valuable assistance of Mr. Banks, these have been successfully overcome, and Messrs. Maw, Son, and Thomson are prepared to supply the apparatus for Poulticing by Steam, with either dry or moist heat—adapted to any part of the body—at a moderate cost. I wish it to be clearly understood that (in accordance with my invariable rule in regard to medical inventions) I have no pecuniary interest in this invention, and in order that the price may be kept low, and the general utility thus increased, I particularly request that it may not be patented.

VIII.—THE FOLLOWING EXTRACTS ARE FROM THE VALUABLE "NOTES OF EXPERIENCES IN EGYPT,"

BY W. H. FLOWER, F.R.S.,

Hunterian Professer of Comparative Anatomy in the Royal College of Surgeons of England, etc.

("British Medical Journal," *Sept.* 19, 26, and *Oct.* 3, 1874.

"I need hardly say that the only time of the year when an

Englishman would think of visiting Egypt for the sake of health would be the winter months, from the middle of November to the beginning of April. During this period the climate, as will be more particularly described further on, is admitted on all hands to be the finest in the world. Doubtless, there are many Europeans who do live all the year through at Alexandria, and even Cairo, with perfect impunity; but few, unless compelled by business or necessity, would choose to do so. * * *

"Notwithstanding all the recent improvements in the means of communication, the distance will be to many a serious obstacle to undertaking the journey. On the other hand, to some to whom travelling is in itself a pleasure and a refreshment, it will be an additional inducement, more especially as the most direct route lies through that paradise to travellers—Italy. A perfectly straight line drawn on a map between London and Alexandria, will be seen to pass through the whole of the Italian peninsula from north to south; and, by taking this way, the sea-voyage is reduced to its shortest. There are two ports near the south of Italy from which there is regular steam communication with Egypt; Brindisi, the nearest, being only three days' voyage, and Naples, one day longer. The easiest way to reach these ports from England is through Paris, Macon, the Mont Cenis Tunnel, Turin, and Bologna, thence direct to Brindisi; or by Florence and Rome to Naples. I would recommend the former route for going out, and the latter for returning.

"To those to whom it is not a great object to avoid every unnecessary day on board ship, there are other routes. 1. The Peninsular and Oriental boats, which call at Brindisi on Monday, start the Friday before from Venice. As they take passengers for the same fare from either port, this route effects a considerable saving in expense, and avoids a long railway journey. Its comparative advantage depends upon the weather to be met with in the Adriatic, which unfortunately cannot be ascertained beforehand. We went this way, and repented having done so, neither my wife nor I happening to enjoy life on board-ship in such stormy weather as was encountered in the voyage last November. 2. The French Messagerie boats which call at Naples, sail from Marseilles, thus greatly shortening the railway, and proportionately increasing the sea part of the journey (to about a week), but, on the whole, it is a tolerably direct route from London. 3. Then there are Italian boats from Genoa, and Austrian boats from Trieste; and, lastly, is the long sea-voyage of thirteen days by Peninsular and Oriental boats

from Southampton to Alexandria,[1] by way of the Bay of Biscay, Gibraltar, and Malta, which by many is recommended in preference to all the others, as avoiding the trouble and fatigue of frequent changes, railway travelling, the constant packing and unpacking, difficulties at custom-houses, and the chance of bad accommodation and unwholesome living at hotels.[2]

"A sea-voyage, varying in length, according to the route chosen, from three to thirteen days, is then necessary in order to arrive in Egypt; and this leads me to say a few words on voyages in general, especially as applied to invalids in search of health. * * *

"The principal objection to persons in delicate health undertaking a long sea-voyage, is the uncertainty about the influences to which he or she may be exposed; while on land, the traveller is to a great extent his own master, and has power to control the surrounding conditions. He may regulate the day's journey, according to strength or inclination; he may linger in such places as have agreeable associations and environments, he may hasten over those that are of an opposite character. But when once embarked upon a voyage, if he find himself crowded in a dark, close cabin, with two or three uncongenial companions, lying on a narrow hard shelf, portholes rigidly closed, and the atmosphere he breathes poisoned by noisome odours, of which the sickening smell of the oil of the engine is one of the least objectionable; the rain pouring on deck, making escape from his prison, even for a few moments, impossible; when he feels that he would give all his worldly possessions for a breath of pure air, or a few hours' cessation from the perpetual din of the engines within and the waves without; he is perfectly helpless, he must go through it day after day and night after night, until the weather changes or the voyage is ended.

"Doubtless voyages may be made under favourable circumstances; the weather may be fine, the ship not crowded, the cabin comfortable, the companions pleasant; but the risk

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[1] "During the coming season, the Southampton boats will run through the Canal to India, without calling at Alexandria. Passengers for Cairo will be landed at Port Said or Ismailia."

[2] "Thus Dr. Dunbar Walker, after beginning by saying, a sea-voyage, and one, perhaps, of a fortnight in length, is a journey full of evil, accompanied by all that can make life miserable to the majority of Britishers, strongly recommends this route in preference to all others; advice tantamount, one might think, to prohibiting the journey to Egypt altogether. It should be remembered that the above-mentioned drawbacks to land travelling can be reduced to a minimum by a careful choice of route and of stopping places, and especially by taking plenty of time over the journey."

and uncertainty of what is before him, the chance of being exposed to such depressing influences as must seriously affect the health, should make an invalid hesitate before venturing on a longer voyage than is absolutely necessary. Of one unfavourable condition, any one going out to Egypt or returning at the usual time, may be pretty sure; that is, excessive crowding of the vessels, it being just the season of the rush of travellers to and from India and all parts of the East; and passengers who make the whole journey have naturally much greater advantages in choice of cabins and other accommodation, than those who are only picked up by the way. * * *

"It should be known that passengers, especially delicate ladies travelling for health, who wish to spend as much time as possible on deck, must be at the trouble and expense of taking their own easy chairs with them. It is difficult to see why the decks of first class ships like those of the Peninsular and Oriental Company, should not be provided with iron or wooden benches made in an easy curve, like those now in general use in our parks and public gardens.

"A special objection to returning by the Southampton route to most invalids, especially those suffering from pulmonary complaints, is that the time consumed in the transit from Egypt to England is too short. It is not desirable to stay longer in the former country than the beginning or middle of April, as the heat by that time often becomes great, and has a very relaxing effect on delicate constitutions; and the almost sudden change to the intense cold of the Atlantic, and the rigours of an English May, such for instance as the last, may undo all the good that has been gained during the winter. It is, therefore, generally recommended, with reason, after leaving Egypt, to spend a few weeks either in Syria, Greece or Italy, and so to pass gradually and insensibly between the two very similar temperatures of an Egyptian March and an English June."

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"Alexandria has no reputation as a health-resort. It is surrounded on the land side by marshes; its climate in winter is variable, and often cold from the prevalence of north wind, and it is subject to violent storms of rain, which convert the streets into rivers of liquid mud.

"The hotel generally esteemed the first, *i.e.*, the largest and dearest, is the Hôtel de l'Europe, situated in the great square, where also is the Hôtel de l'Orient; but Abbât's, a little higher in the town, is now much resorted to by English travellers, as it has the advantage of being somewhat less expensive, and is not inferior in comfort and cleanliness.

English ladies going for the first time to the East must be prepared for finding no female attendants of any kind whatever in any of the hotels in the country; the waiters are Italians, Greeks, Germans or French, the bedroom servants Arabs; so, if they be delicate and likely to require attendance in their bedrooms, they will do well to take a maid with them, though certainly many ladies accustomed to travelling and to help themselves do contrive to get on in Egypt without this often troublesome appendage.

"The system of living at all the hotels in Egypt is the same; a fixed charge per day for bedroom and meals, including lights and attendance. A separate sitting-room is always an extra, and generally an expensive one. The meals included in the general charge are—breakfast, any time between seven and ten, consisting of coffee or tea, bread, butter, eggs, preserves, or honey; a very ample lunch or *déjeûner à la fourchette*, at noon or half-past, consisting of a considerable variety of well-cooked dishes, followed by fruit; and an abundant *table d'hôte* dinner at half-past six. After lunch and dinner, a small cup of thick Arab coffee, or sometimes French *café noir*, is always served. Wines, beer, mineral waters, &c., are extras, and dear; the lowest price for French vin ordinaire being four shillings a bottle in all the hotels of Alexandria and Cairo. The daily charge is the same, whether one partake of the meals or not; and, according to the published tariff, meals served at irregular times or in the bedroom are charged extra, though we never found this insisted on in the case of illness. The charge at Abbât's Hotel is twelve shillings per day; at the other two, sixteen shillings, as at the large hotels at Cairo. No difference is made whether the worst or the best bedroom in the house be occupied, the choice of rooms being given to the first comers. If the visitor stay long, he can improve his quarters by watching for rooms as they become vacant. But more on this subject when we come to Cairo.

"At Alexandria, some of the historical 'plagues' of Egypt will be met with in full force. Mosquitoes and fleas both abound, the former, perhaps, on the whole, the most troublesome, but that depends much upon individual constitution. * * *

"While on the subject of mosquitoes, it will be well to mention that though common at Alexandria and Cairo all the year round, they are happily quite unknown on the Nile a few days' journey above the latter place, and even fleas diminish the higher the river is ascended, and in Nubia are no longer met with.

"It is a good plan to have a square yard of fine white

net while travelling in Egypt. It will be useful to have in bed to throw over the face in case of a mosquito surreptitiously invading the guarded precincts during the night if one be indisposed for the more radical method of a hunt, and also for a protection against flies during an afternoon siesta.

"A few miles to the east of Alexandria, is a strip of land lying along the Mediterranean coast raised above the general level of the Delta, which being formed of calcareous rocks and covered with sand, partakes of the physical characters of the desert. It is, therefore, reputed to be superior in salubrity either to Alexandria itself, or any other part of the neighbourhood. Here most of the European residents of Alexandria have built villas to live in during the hot season; and there is a quiet family hotel called 'Beau Séjour,' which must be preferable to those in the town for any visitors under the necessity of remaining long in this locality. There is a railway from Alexandria, about five miles in length with several stations at different parts of *Ramlé*,[1] as this suburb is called. The station at Alexandria is close to Cleopatra's needle, and at the opposite end of the town from the main station for Cairo and Suez.

"Cairo, the capital of Egypt, is one hundred and thirty miles from Alexandria. It is reached by railway in four-and-a-half hours by express, and in six hours by ordinary trains. Refreshments can be obtained, if necessary, at Kafr ez Zyat station, about half way. The line runs the whole distance through the Delta, a low-lying, level, green, fertile, populous land, intersected by numerous canals and branches of the great river. * * *

"An Englishman arriving at Cairo will be pretty sure to go to one or the other of three hotels, Shepheard's, the New Hotel, or the Hotel du Nil; and he should make up his mind which it is to be beforehand, and at once put himself and baggage in charge of the commissionaire, who will be in waiting at the station. At no railway station in the world is the scramble of volunteer porters to get hold of the newly arrived passengers and their baggage more vigorous and vociferous than at Cairo. During the full season, it is best to write or telegraph from Alexandria to secure the rooms required.

"The old-established Shepheard's (now Zech's) is still the favourite with our countrymen. It is a large, plain, two-storied, quadrilateral building, with a garden in the interior, and also on one side. It faces what was formerly part of the

[1] Arabic for "sand."

Esbekeeyah or public square; but a colonnaded row of stone houses is being built immediately opposite the hotel door, which rather deteriorates from the advantages of the situation, but it is still open and airy on the sides and behind. The back rooms, which look into a large palm garden, though smaller and not so well furnished, are pleasanter for those that like quiet than the rooms in front.

"The interior arrangements do not differ much from those of European hotels, except that there are no bells, which is sometimes a source of inconvenience, though an attendant is usually posted in each corridor, who can be summoned by the oriental fashion of clapping the hands. There is nothing much to be complained of in the way of cleanliness, it being about on a par in this respect with the better class hotels of Southern Europe. The scale of living is very abundant, and though, as in other hot countries, the roast beef and mutton cannot be fairly compared with the best articles of the kind in England, there is no chance even for the most fastidious, of being starved. I think the danger lies rather in the other direction.

"The charge is sixteen shillings per day. Occasionally a slight reduction is made for those who are contemplating a long stay. Lights are included, and servants nominally, though, of course, the latter expect a small gratuity on leaving. Washing is done in the hotel fairly well, but at very high prices. For a sitting-room, about a guinea a day extra is charged. Of course with a large party this is convenient, though not absolutely necessary; for it is a common practice, as on the continent of Europe, to sit and receive visitors in the bedroom; and there are a reading-room on the ground-floor, the garden, and the wide covered porch in front of the entrance hall, a favourite resort with those whom idleness or ill-health restrains from more active employment. It is certainly difficult for a new-comer to resist the temptation to while away some time here, for the sake of the moving panorama of oriental life presented by the street below.

"The New Hotel is a far handsomer building than Shepheard's, and better placed, being exactly opposite the centre of the recently improved Esbekeeyah garden. The interior arrangements are more modern than those of Shepheard's, the rooms being well furnished and provided with electric bells. The prices, living, etc., are exactly the same. The cooking last year was considered by connoisseurs to be better; but that, of course, may vary. The manager and all the attendants were exceedingly civil and obliging. We spent four weeks at Shepheard's, and three at the New Hotel, and found little to choose between them. The principal difference was in the

company: Americans, French, and Italians mostly frequent the New, while the English keep very much to Shepheard's.

"The Hotel du Nil seems to be a great favourite with Germans, and also with many English gentlemen travelling alone. It is smaller than the others, and somewhat less expensive, but is well spoken of for comfort. The great objection to it, especially for ladies, is the situation. It is in the most crowded part of the town, and can only be approached by a very narrow alley, leading from the Mooskee, the Regent Street of Cairo. The hotel is pleasant and quiet enough, having a pretty garden in the centre. * * *

"The drinking-water at the hotels at Cairo, being obtained from the Nile and filtered, is generally good and wholesome. This applies to Egypt generally; the large volume of water flowing down the river, being sufficient to counteract the effect of any small amount of impurity that may find its way into it. It is always kept in the native jars of porous clay or *goulas*, by the evaporation from the surface of which the temperature of the water is kept down to a refreshing point even in hot weather.

"Cairo is now well supplied with European physicians. Dr. Grant (Scotch), Dr. Bull (Danish), Dr. Warren (American), and Dr. Sachs (German) are those most in repute among the visitors; while Mr. Broadway and Mr. Waller are dentists in large practice. The shops are furnished with all European articles; the postal service is frequent and regular, and telegraphic news from London and elsewhere is daily posted in Robertson's reading-room. We learnt the result of the last Oxford and Cambridge boat-race on the afternoon of the day it took place. * * *

"The resources of Cairo to the intelligent traveller are inexhaustible. Physical strength will be the only limit to the perpetual feast of eye and mind.

"The means of locomotion are now greatly improved; comfortable two-horse open carriages are always standing at the hotel doors, and, since the new iron bridge across the Nile has been opened, the Pyramids and nearly all the places of interest in the neighbourhood can be reached with wheels. But donkey-riding is still pre-eminently the favourite and most convenient method of getting about, both with the natives and visitors. * * *

"Ladies ride as well as men. It enables them to explore many parts of the town and neighbourhood too far for walking, and not easily accessible to carriages; and as, further up the country, donkey-riding is the only means of visiting nearly all the most interesting ruins, it is well to practise the art at Cairo. Side-saddles, a few years ago, were almost unknown

in Egypt, as the Turkish women never use them, and so it was advisable for ladies to take them out as part of their baggage; but now there is no difficulty in buying or hiring them at Cairo.

"The chief characteristic of the climate of Egypt, is its dryness. In the richly wooded districts of the equatorial regions of Africa, where the numerous affluents of the Nile take their rise, almost continuous rain prevails; but, in the deserts of Nubia and Upper Egypt, through which the great river flows in its course to the sea, sometimes years pass without a single shower. The absence of rain and absence of vegetation are obviously related to one another. The Mediterranean coast, as before mentioned, and the Delta, are less dry than the upper parts of the country, and Cairo occupies an intermediate position.

"It is the opinion of some observant residents that the climate of Lower Egypt is becoming modified, and the rainfall increased, by extended cultivation and by alterations produced in the physical features of the country due to the formation of the Suez Canal.[1] However this may be, all are agreed that last winter was quite exceptional in the amount of rain that fell; but, as this was much the same all round the Mediterranean basin, it must have been due to something more than local causes. How much it amounted to will be seen from the following extracts from my journal, which record all the times at which rain fell during five months we were in the country, *i.e.*, from November 21st to April 20th. 'November 21st: in Alexandria harbour; heavy showers of rain. November 26th: very heavy rain at Alexandria in the night and early morning, and also a slight shower on arrival at Cairo the same afternoon. December 19th: some rain early in the morning. December 27th: much and heavy rain and hail. December 28th: some showers. January 11th and 12th: at Bedreshayn, about fifteen miles south of Cairo; some slight showers of rain. January 28th: on the Nile above Rhoda; a slight shower in the middle of the day. February 3rd: at Souhag, Upper Egypt; a heavy rain nearly all night, and a close cloudy day, with occasional showers and no sun. February 4th: rain again in the night and showers in the day. March 4th: at Thebes; a very slight shower in the middle of the day.'

"Thus, in this exceptionally wet season, there were only eleven days out of one hundred and fifty on which rain fell, and on some of these it was scarcely more than a few drops.

[1] See the remarks of Dr. Grant, in Murray's *Handbook*, 4th edition (1873), p. 2.

"As a general rule, the days are much like one another: fine, clear, bright, and sunny. The subject of the weather, so important to us in our island home, soon loses all interest, owing to absence of change.

"Another characteristic of the Egyptian winter climate is, that, though the days are warm, even hot in the sun (usually about 70 deg. or 75 deg. in the shade), the nights are fresh and cold, and often accompanied by heavy dew, the thermometer, frequently falling to 40 deg. or below, though rarely quite to the freezing point. To many constitutions, this is advantageous. A sultry night following a hot day often induces languor and depression; but the freshness of the Egyptian night and early morning is invigorating and bracing, and enables one better to bear the fatigues and heat of the day. Persons with delicate lungs find the rather sudden change from day to night temperature somewhat trying. Any bad effects that may arise from them can always be guarded against by taking proper precautions, especially not remaining out of doors after sunset, or, if tempted to linger to watch the beautiful after-glow which often appears in the sky, always putting on extra clothing. Such persons should never set out for a drive in the afternoon without taking some wraps to put on directly the sun goes down. By carefully regulating the clothing, the injurious effects of the great alterations of temperature can always be counteracted. Fire-places are provided in the rooms of the New Hotel, though not in any of the others; it must be very seldom, however, that the necessity for a fire can be felt.

"In considering Egypt from a hygienic point of view, it is extremely important to understand that, physically, the whole country is divided into two distinct regions.

"1. The low-lying alluvial plain, beneath the level of the annual overflow of the Nile. Throughout the greater part of the country, this is a narrow strip bordering the river, scarcely averaging five miles in breadth; but at the north it widens to form the Delta, a triangular patch, whose apex is at Cairo, and base, about one hundred miles in width, on the Mediterranean shore. This is the cultivated and highly fertile part of the land. Its surface consists of mud on the receding of the water in the autumn, but soon dries under the influence of the sun into a rich, dark-coloured, sandy loam. It is the product of the disintegration of the primitive rocks of the mountainous districts of Abyssinia and other regions of Central Africa, where the Nile tributaries take their source.

"2. All the rest of the country which is above the level of the autumnal overflow. This is the *desert*. Its line of de-

marcation from the cultivated land is most sharply defined. It is far from being the monotonous, level, sandy plain that we had been accustomed to associate with the name, but consists, in Lower and Middle Egypt, of limestone rocks of marine origin, rising in terraces or escarpments, one above another, from the river valley, the stratification being generally very horizontal, and ending in a high tableland, carved and scored out in various directions, evidently by long-continued action of water, into wide open valleys or narrow gorges; in the bottom of some of these, a little scanty vegetation, the curious *Anastatica*, or 'Rose of Jericho,' and the camelthorn, may be found growing; but generally all is absolutely barren. Yet by artificial irrigation, as in some parts in the neighbourhood of Cairo and at Ismaielah, the desert can be made green and fertile. * * *

"It should be the object of those who go to Egypt for the benefit of their health to breathe as much of the air of the desert as possible, and it is unfortunate that this cannot at present be obtained in the places of residence which afford the greatest facilities and comforts for invalids. Cairo is situated on its edge, but the hotèls, and all the modern town in fact, are built on low ground, which, until reclaimed artificially, was subject to the overflow, and they have the whole of the ancient city, with its crowded population and impure streets, between them and the desert. Moreover, the prevailing winds, being from the north, blow directly across the Delta. This and the great amount of dust, not of the cleanest kind, which fills the air of a great city full of people and animals, form the principal drawbacks to Cairo as a residence for invalids. What is greatly wanted is a place where good accommodation and comfort, combined with moderate expence, could be obtained a few miles out of Cairo, somewhere on the Mokattan Hills.

"The nearest approach to this is the establishment which has just been opened at Helwân, or 'Helouan-les-Bains' (as it is spelt in French), about fifteen miles south of Cairo, and three from the east bank of the river. The origin of this place was a spring of warm sulphurous water, similar in composition to that of Aix-les-Bains, in Savoy. Baths were erected here a few years ago for the use of the Khedive and his family. These have lately been considerably enlarged; and Dr. Reil, a German physician, who has lived some years in Cairo, and who speaks English well, has been appointed resident director of the establishment. Two hotels or boarding-houses, though not quite completed, had just been opened when I visited the place in January last. By next season, it will all be in good working order, and several hundred visi-

tors will be accommodated at more reasonable prices than in Cairo.

"The situation was determined by the mineral spring, which wells up in the middle of a flat sandy plain, about midway between the river and the range of rocky hills that flank the Nile valley in the east. Although not so agreeable as if higher on the hill-side, it is well within the border of the desert and fairly above the river-level.

"Apart from the peculiar medicinal virtues of the waters (which are especially recommended in case of chronic rheumatic, cutaneous, and hepatic diseases), a residence at Helwân would probably be better, in a sanitary point of view, than in the hotels of Cairo; the air is purer and the life quieter; but, for those who have not plenty of resources within themselves, it will scarcely offer the same attractions. At present, it is rather difficult of access, but the road will probably be improved before next winter.

"The only other places where European travellers could pass the winter in Egypt (apart from the Nile boat, to be spoken of in the next article), are Suez and Ismailia. There are hotels at both, but of neither of them can I say anything from personal knowledge. Ismailia is a new place on the side of the Suez Canal, and has some pretty gardens on land reclaimed from the desert. It is reached by rail from Cairo in about nine hours. Its attractions are pure desert air and quiet, for it is quite away from all historical objects of interest. The principal outward events in life there must be the passage of vessels through the canal.

"Few English who pass a winter in Egypt are content to remain the whole time at Cairo. The interest that has been awakened in the ancient history of the country must naturally make every one anxious to see the still remaining evidences of the wonderful civilisation of the Nile valley three thousand and more years ago. * * *

"For visiting Upper Egypt and Nubia, none of the ordinary modes of travelling familiar to Europeans are available. There is not a single hotel, or place where board and lodging can be obtained anywhere above Cairo, except by roughing it to an extent which would not suit those for whom these notes are written. A system, has, however, gradually developed itself by which all the conveniences and even luxuries of European civilisation can be enjoyed in the desert of far-off Nubia. The traveller moves on from place to place along the river in a floating-house, which he never need leave for long, as everything of interest lies within easy reach of the banks. Of all modes of travelling, this is, perhaps, the most enjoyable. With agreeable friends, a well furnished, com-

fortable dahabeah or sailing-boat, an attentive and intelligent dragoman, a good crew, and plenty of time at disposal, it leaves nothing to be desired. One can go from Cairo, to Wady Halfeh at the second cataract, about eight hundred miles, without more fatigue or trouble than if you were staying all the while in a house by the seaside. Occupations can be continued as one moves along without interruption occasioned by packing or unpacking, and all the disagreeables and uncertainties incident upon arriving at and leaving strange hotels; there are no payments of any kind to make, all being contracted for before departure. It is a perfect rest from nearly all the little cares and troubles of the world. Besides the objects of paramount interest to which I have already alluded, there are endless minor ones: the varied scenery of the river-banks, the inhabitants, the bird and animal life, the navigation of the boat, even the uncertainties of the journey add to its zest. A fair wind may carry one fifty miles in a day, or there may be many days without any appreciable progress. There are all the advantages of a long sea-voyage without the drawbacks mentioned in the first chapter. The sleeping cabins are light and airy; the weather is almost always fine, so that nearly the whole day may be spent on deck, and the variety and exercise of a walk on shore can generally be got at some time or other in the twenty-four hours.

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"To persons of impatient disposition, to those not fond of reading or of quiet contemplation of the beauties of Nature, the Nile voyage in a dahabeah certainly may prove tedious. For such and for others whose time and means are absolutely limited, there are the steamers, now all under the direction of Messrs. Cook and Sons. Each vessel carries from fourteen to twenty passengers; and they run at uncertain intervals, according to the season and the number of travellers, which can all be ascertained at the office close to Shepheard's Hotel. The time occupied in going to Assouan and back (for they do not ascend the cataract) is three weeks, and the charge £46 per head. All the principal objects of interest are visited, a certain number of hours being allowed for each temple or tomb. This is altogether a convenient method for those who wish to 'do' the country expeditiously and economically, but not to be recommended either for travellers in search of health, or for those whose object is not to return able only to say that they have seen the country, but to feel that they have entered into its spirit, and impressed it so fully into their minds as to have made it part of themselves for the rest of their lives. The very delays of the sailing voyage have their advantages to the latter class of travellers,

giving time for reading and reflection upon what has been seen, and enabling one to see the country under a variety of different aspects, and to learn much as to the habits and social condition of the inhabitants, for which there are no opportunities in the hurried steamer voyage.

"The life on board a dahabeah is generally a healthy one. It is essentially an out-of-door country life. The air, though perhaps not equal to that of the higher parts of the desert, is pure and bracing; for, owing to the narrowness of the strip of fertile land on the sides of the river (sometimes indeed quite absent, the rocks coming down to the water's edge), the air is practically that of the desert. On the first subsidence of the water after the autumnal overflow, the banks are muddy and damp, so it is well not to take to the water until December, by which time they are well dried by the sun, though January, February, and March are the best months. In April the water has often fallen so low, that navigation becomes difficult, owing to the numerous shoals and sand-banks. Even in autumn, malarious fever appears to be very uncommon on the Nile banks, except in the Delta. The higher the river is ascended, so the salubrity increases, especially above the cataract, where the cultivated land is often reduced to a strip of a few feet in width along the water's edge, the river literally flowing through the desert.

"The nights are generally clear, bright, and cool; sometimes, in the lower country, heavy mists are found to hang over the river in the early morning, which, however, are dissipated the moment the sun sends forth his genial rays. To guard against the cold of the night, a good supply of shawls and rugs must not be omitted, as no artificial heat can be obtained on board the boat, and persons subject to pulmonary affections should always keep within the cabin after sundown. Warm clothing is essential on a Nile voyage, for even in the daytime the wind is often keen.

"The dahabeahs are flat-bottomed boats, with huge latteen sails, generally capable of accommodating from two to eight passengers, according to their size. * * *

"Our own living on board was entirely under the control, and dependant upon the care, of the dragoman and his cook, who, considering the exceedingly limited space in which his operations were conducted, and the materials at his disposal, turned out a wonderful variety of dishes. Fresh buffalo-milk was obtained almost every morning at the nearest village; eggs, fowls, turkeys, and sheep were always to be had, and often vegetables, such as spinach, lettuce, and onions; but, for everything else, we had to depend upon the stores laid in before starting, consisting of hams, tongues, preserved meat,

vegetables, fruit, flour, and the other usual requirements of the kitchen. Good bread was made daily on board. I mention these things to show that no one need fear starvation on a Nile boat. Indeed, I could not help often contrasting the almost too abundantly supplied and varied table of the saloon, with the simple fare which appeared to fulfil all the requirements of health and strength to the crew. It may happen, however, with a dragoman not liberal or conscientious, with stores insufficient in quantity or quality, and an indifferent cook, that delicate or particular persons may come off badly on a Nile voyage; but this is now rather the exception than the rule.

"The river affords an unfailing supply of excellent water for bathing, washing, and drinking. For the latter purpose, all the mud with which it is abundantly charged is completely separated by filtering through one of the native large porous earthen jars or *ballas*. Anything that may be required in the way of wine, or beer, or mineral waters, must be laid in before leaving Cairo, according to the requirements of the party, for they do not form part of the dragoman's contract. Those who are particular often send their stock of wine direct from England, and this is on the whole, perhaps the most economical way when a large supply is needed, as everything of the kind is dear in Egypt.

"Nile voyages almost always terminate either at Assouan, at the foot of the first cataract, the limit between Egypt and Nubia, or at Wady Halfeh, at the second cataract. The shorter voyage occupies about eight or ten weeks, the longer one three or four weeks more. As dahabeahs cannot ascend the second cataract, it is not possible to continue the journey in the same boat beyond Wady Halfeh.

"Contracts are made with the dragoman and owner of the boat for the journey. * * *

"As in the case of almost every thing else, the expense of Nile travelling appears to be increasing at a rapid rate. This is partly owing to the superior accommodation now afforded, and the larger amount of comfort and luxuries that travellers appear to need. But there is no doubt that all the necessaries of living have vastly increased in price during the last few years in Egypt. The time when fowls could be purchased for twopence apiece, and sheep for as many shillings, has long since passed away.

"The present cost of the voyage will, of course, vary according to the style in which it is performed. The owners of very superior well-built, clean boats, used for no other purpose than to carry travellers, will naturally be able to ask more than need be paid for the rough old-fashioned kind, which had to be sunk in the river before starting to clear off the

previous occupants, and in which English ladies would scarcely care to travel. Dragomans also vary much in their charges, and the number of the party joining to take a boat always has a very important influence upon the expense. The larger the number, the less will be the cost to each. Some persons prefer to travel alone, rather than run the risk of uncongenial companions. An English lady, last year, went up by herself in a dahabeah as far as the second cataract. Sometimes parties are made up at the hotels in Cairo. Supposing that four join in taking a boat, the entire expenses may be set down at somewhere about £2 per day for each. If the number be larger, they may be reduced to about £1 10s.; but, as I said before, these figures are subject to a considerable variation in either direction, according to circumstances, among which the bargaining powers of the manager of the party must be taken into account.

"It will thus be seen that Egypt offers almost every advantage for a winter residence for invalids, excepting, economy."

Cairo and its Climate. By Dr. Moritz Fürstenberg. "Lancet," *January 11th*, 1873.

"Stoves and fireplaces, which patients miss so much in Italy, are here quite unnecessary. The extreme dryness of the atmosphere is slightly modified by the dew and the mists, the latter being always more or less apparent in the mornings till nine to ten o'clock. There are so few windy days in the winter that the dust is but rarely an annoyance. The dreaded south wind, "Chamsin," hardly ever blows till the end of March, and is only prevalent in April and May. We will not here go into the question of its depressing effects, as in the winter months it is almost unknown; suffice it to say that it is always accompanied with clouds of dust so penetrating as to cover the room, even with closed windows, and naturally producing considerable irritation of the conjunctiva. It never rains in Cairo more than eight or nine times in the course of a year, and then only in showers hardly exceeding an hour's duration, and thunder-storms rarely occur more than once or twice.

"For all patients who require warmth, and who are subject to cold, it is scarcely possible to find a more suitable climate than Cairo. We consider it specially adapted for all chronic catarrhal affections of the organs of respiration, and for cases of catarrhal pneumonia. In cases where infiltration has not taken place, there is hope for a cessation of the symptoms and

ultimate complete cure; when it has, a favourable result may still be anticipated, and even in hopeless cases euphoria may be attained. According to the experience of the resident physicians the climate is not favourable to erethic patients with a dry irritating cough. Cairo is specially suitable for young persons who have recovered from attacks of hæmoptysis — that is to say, in cases of blood-spitting where no alterations in lungs can be observed. The author saw himself, amongst the resident Germans in Cairo, many who had suffered from hæmoptysis, and who had been so completely cured by the climate that they were able to pursue the most arduous avocations without the slightest symptoms of relapse. Even in cases where alteration in the lungs has taken place, a sojourn in Cairo usually produces temporary relief, and sometimes entire cessation of the destructive process, and repeated hæmoptysis must not be assumed to be an indication of the contrary.

"In cases of anæmia, and especially when accompanied by hysterical affections, the fine weather and regular temperature of Cairo are found to have a most favourable effect. *

"We should certainly not recommend Cairo for diseases of the intra-peritoneal organs or for cases attended with much hypertrophy of the heart, or for apoplectic subjects.

"Strangers are soon acclimatised in Cairo; some suffer at first from restlessness at night and nervous irritability, but these symptoms are rather attributable to the patient's over-anxiety as to the probable effect of the climate on his or her disease than to the climate itself. * *

"Sluggishness of the bowels and diarrhœa are usually brought about by improper living, the first by insufficient exercise, the second by excessive consumption of fruit or of liquids. Epidemic dysentery seldom occurs in winter. Continued inactivity of the bowels, is, however, a decidedly predisposing cause, and we therefore recommend patients to take a slight aperient on landing, as constipation is frequently brought about by a sea-voyage. * * *

"In returning from Egypt, the journey should be so arranged that the patients reach Europe when summer is approaching, so that the change of climate may be less felt. It will be generally found expedient to pass some little time at Alexandria or Ramleh, and after the voyage to return by slow stages through Italy. Corfu may also be taken as an intermediate resting place. Those patients whose state of health requires their always passing the winter in Cairo can remain during the summer, without inconvenience from the heat, at Ramleh, which is close to Alexandria. The journey

is not by any means a difficult or particularly tedious one. Patients can go either from Trieste to Alexandria by the Austrian Lloyd steamers in five days, and thence to Cairo in about six hours, or they can go from Brindisi to Alexandria by the Peninsular and Oriental line in three days. For consumptive patients we should recommend the first route, provided that there is no peculiar danger to be anticipated from prolonged sea-sickness."

IX.—DR. DE PIETRA SANTA ON THE CLIMATOLOGY OF FRANCE. "British Medical Journal," *February 21st*, 1874.

"Last week, Dr. De Pietra Santa, a well known hygienist, entertained a large audience of both sexes on the climatology of France, and the influence of climate on disease. France, said the orator, possessed five very distinct climatorial regions, which he designated thus: the Vosgian, or north-east; the Sequanian, or north-west; the Girondin, or south-west; the Rhodanian, or south-east, and the Mediterranean, or Provençal. Each of these regions presents a different zone, according as it is near or at a distance from the sea, or according as one descends the valleys or ascends to the mean heights. The maritime atmosphere is more uniform than that of heights; the barometrical pressure is constantly strong; the air is purer, and is renewed by the sea and land breezes; in equal volume, the sea-air contains more oxygen, is impregnated with sea-salt and a peculiar odour which it acquires from marine plants. Such an atmosphere would tend to develop the strength of the different organs, increase the power of the muscles, modify and harmonise the central and peripheric circulations; and, finally, would exalt the activity of the intellectual faculties. The air of hills and mountains, Dr. De Pietra Santa continued, at a height of 700 *mètres*, or about 2,300 feet above the level of the sea, presents the following characters. It is naturally lighter, and contains, in equal volume, a smaller proportion of oxygen; it is impregnated with a more considerable quantity of watery vapour, and it contains a good deal of ozone. The influence of such a climate is particularly sedative and soothing, whereas a maritime one is tonic and stimulant. The practical application of this would be, that patients, and others requiring change of air, ought not to adopt one or other climate without previously taking the advice of a medical man, as it is evident that what would suit one will not suit another. Dr. De Pietra Santa concluded by recommending the climate of

the South of France, as the best in Europe for nervous affections and chronic diseases of the respiratory organs."

X.—CLIMATE OF PAU. Extract from a Letter from Dr. E. May, who spent several winters at Pau.

"In the notes I sent to the 'Lancet,' March 30, 1872, alluding to an idea, which is not very uncommon amongst the public generally—that the climate of Pau is relaxing—I omitted to state its altitude, which in a sanitary point of view is very important, it being 850 feet above sea level; again no writer on the subject has ever registered it as relaxing, but eminently *sedative* in common with Rome, but Pau has this advantage over Rome *that it is situated between* 20 *and* 30 *miles South of the Pyrenees, a circumstance which tempers on one side the violence of the cold winds of the North, and on the other, the oppressive and enervating influence of the South wind or Sirocco, since it passes over peaks covered with snow.*

"Another feature against the climate of Pau has been dwelt upon, viz.—the amount of rainfall, which is considerable as compared with that of London, viz.—40 in. in the year, while in the latter place it is only 29, and, as a corollary to this, a supposed humidity of the atmosphere. In explanation of this, the rain falls sometime two days at a time; this is followed by warm sunshine, while the ground, from the absorbent nature of the soil, dries rapidly; the hygrometer goes to prove the comparative dryness of the air.

"*Pau, being* 8 *degrees nearer the Equator than London,* we have about one fourth more sun than you have in England, and there are few days, even in December and January, upon which the invalid is prevented from moving out of doors between the hours of twelve and three, when the windows of the apartments are thrown open to ventilate and warm the interior.

XI.—CLIMATE OF SOUTH AFRICA. Extract from a Letter ("Lancet," *October* 20*th*, 1866), from R. N. Rubidge, M.B.. Lond., F.G.S., Physician to Province Hospital, Port Elizabeth.

"For my purpose South Africa may be divided into —

"1st. The eastern coast regions. Low hills and plains of palæozoic slates and mezozoic sandstones and clays. This tract varies from ten to thirty miles in breadth, and is bounded by a range of quartzose mountains.

"2nd. The intermediate plain region beyond the first moun-

tain range. Koroo plains and low hills, with an average elevation of about 1,500 feet, and about 100 miles in breadth.

"3rd. A high mountain range bounds the last region, and beyond it are the great plateaux of the interior 4,000 to 6,000 feet above the sea, and intersected by minor hills and mountains. Through these vast plains the Orange, Caledon, and Vaal rivers and their tributaries run.

"4th. The low hills and plains on the western or Atlantic shores of the continent.

"Of these regions, the first has a not unhealthy climate; but the alternation of north-east wind blowing over the dry and hot continent, with the cold south-east wind from the sea, with their widely different hygrometrical and electric conditions, renders it unsuitable to cases in which tubercle is developed or threatened. While Port Elizabeth and Uitenhage, from their geological position on the margin of a mezozoic bay, on whose bottom a deep series of clay-beds was deposited, are peculiary unadapted to such cases.

"The second region is much better. In this Ceres, Willow more, Graham's Town, Fort Beaufort, Alice, and many other towns are situated.

"But it is on the high plains, stretching from the second range of mountains I have mentioned to beyond the Vaal river, and including the higher part of the district of Graaff Reinet, with those of Colesberg, Richmond, Victoria, East and West Albert, the Free State, and the high lands of Kaffraria, that perhaps the finest climate in the world for pulmonary complaints is found. I have sent many patients thither who have come out from England with diseased lungs, and some in whom phthisis has been developed here, and I have rarely or never been disappointed. Some have lived much longer than they would have done here; others, in whom nearly half of one lung was consolidated, have quite recovered, and remained well for years.

"Of the fourth region I have not much personal knowledge; but I believe it has not the drawbacks of the eastern coast region. Wineberg and other places in the vicinity of Cape Town are very healthy.

"If this difference in the climate of parts of South Africa be borne in mind, it will save much disappointment."

EXTRACT FROM A LETTER WRITTEN BY MRS. WM. C. ESDAILE DURING HER RESIDENCE AT CAPE TOWN, *dated September*, 1872.

"You ask me my own knowledge of this place and climate. I have hardly been here long enough to know much, but I

send all I can. In winter the heat is about equal to that of our April, and I have rarely if ever felt the need of what we call warm clothing. In fact, I have never used furs or wraps at all, even in the (Cape), coldest weather, and we have not had a fire since I left England. North-west is the special winter wind, and is not to be depended on at certain days or hours like the summer south-eastern, but comes in sudden and terrific gales, generally causing about a dozen shipwrecks along the coast. The rain generally comes in a continuous downpour lasting for about two days or more, but there are many showery days in the spring months or rather in the later winter months. Often after a day's rain, the sides of Table Mountain look like a great cascade, from the rushing over from the flat top of the collected rain. This year the rain has been unusually bad, raining for three consecutive days last month, so that the force of the water down the streets actually carried down several children, and even adults could not cross the streets. The low lying stores at the beach end of the town were four feet deep in water, and an immense deal of damage was done. Several violent south-easters have blown this year, which is unusual in winter, and we have had after a cool day a day of English July heat, when the air has been full of mist from the steam off standing water. Mornings and evenings are generally chilly except before rain, when the air is sultry and close. In summer the heat up to one p.m. is excessive, the sun seeming to strike up from the red and white sandy roads, as well as pouring down, so that the air seems full of a solid resisting heat that is perfectly breathless. When a south-easter blows (which in summer it does about five days out of seven) it generally begins about one p.m. and continues till one the next morning. It is nearly impossible for ladies to venture out in a regular 'Cape doctor,' as this wind is called, for its strength is tremendous, and it bends down the most powerful trees, and fills the air with particles of red sand. Just close under the protection of the mountain it is comparatively quiet, but wherever the kloofs give an opening for a south-easter, trees grow sideways, bending away from the hills, and thus showing the usual direction of the wind. A long strip of white cloud hanging over the top of Table Mountain in an otherwise clear sky, is a sure sign of a south-eastern wind—and a cloud obscuring the Lion's head as sure a sign of rain. The climate of *Port Elizabeth* is said to be more equable than this; but when I was there in July we had five days consecutive warmth and calm, and then a change to greater cold than I had yet felt, and wind, and again a change to warm.

The sand at Port Elizabeth is large- almost small pebbles, which makes a wind intolerable. On the *very* high ground near Aliwal North, in New England (9,000 feet above sea-level), the climate is exceedingly English but rather more equably cool. Although running streams *never* freeze, the cascades are frozen into white ice pillars for weeks together in winter, and through all the Eastern provinces people often die of exposure to the cold while it is hot in Cape Town.

"You ask also about food. Beef is now eight pence a pound (best), and mutton five pence—this is considered rather high, but it has been this price for six months now. Fish is the staple diet, and is exceedingly cheap, *snook* being a half-penny or penny each in season—and snook is a yard long, and sometimes more—other fish rise as high as eighteen pence each—but this of course is a largish fish. Potatoes and cabbages seem to grow best, and are the usual vegetables. *Rice* is eaten with almost every dish, amongst the Dutch especially. Fruit is cheap enough, and is eaten in immense quantities. Indeed, Cape children seem always to have a mouthful of orange or peach or apricot, and can produce any quantity from their pockets."

XII.—EXTRACT FROM "A NOTE ON ARCACHON FOR ENGLISH READERS." By the Reverend S. Radcliff, British Chaplain.

"Arcachon is situated about 35 miles to the S.-W. of Bordeaux, on the shore of a triangular, land-locked bay, called the *Bassin*, the entrance to which cannot be seen from any part of the town, which stands on the south side of the *Bassin*, on a promontory describing a curve facing N.-E. on the East side, and N.-W. on the west. The town is built upon what used to be called "La petite forêt," a forest of great antiquity, belonging to the town of La Teste. Immediately behind it is the more recently planted forest, which extends along the coast to the Adour, a distance of about 70 miles, but which is only about 5 miles wide. In this forest the *Ville d'hiver* has been built.

"Arcachon may be reached from England either by the long railway journey, via Paris or Tours, or by steamboat, to Bordeaux. The vessels of the Pacific Steam Navigation Company, which sail for Valparaiso, from Liverpool, twice every month, are most comfortable, and generally make the passage from Liverpool to Pauillac (where passengers for Bordeaux disembark), in about 60 hours: fares £5 in the first cabin, and £3 10s. in the second. In fine weather this voyage is

most agreeable and not at all so fatiguing as the railway journey. It also affords a panoramic view of the celebrated vineyards of the Médoc. * * *

"Arcachon is at present a town containing about a thousand dwellings and about three thousand resident inhabitants; but the number of strangers who visit it annually, for a longer or shorter period, is estimated at about three hundred thousand. The English resort to it principally in the winter and spring months. In the winter of 1869-70 the English population was about 200; but the late war, and the unsettled state of the country, have considerably reduced their numbers at the present time.

"Arcachon comprises two distinct towns, with two distinct climates. The one lies along the shore, and extends back towards the forest. Its principal street, the Boulevard de la Plage, of which the western prolongation is called the Boulevard de l'Océan, is nearly 3 miles in length. Between it and the sea is a very striking series of villas, which can be best seen from a boat on the *Bassin*. Among the most remarkable objects on the shore, are the Château of M. Deganne, which is said to be a good imitation of Chambord; the Grand Hotel, conspicuous on account of its immense size; and several of the villas, especially those at what is both literally and metaphorically the west-end of Arcachon.

* * * * *

"Even when Arcachon was only a sea bathing place, it began to be remarked that certain forms of chest disease were much benefited by residence there; and Dr. Pereyra, and others, saw in the combination of sea and forest most suitable materials for a winter resort; the sea air tending to keep the atmosphere at an equable temperature, and the forest affording perfect protection from the violent storms which blow in from the ocean, and exercising a peculiarly healing influence upon the mucous membrane of the bronchial tubes, by means of the resinous emanations from the pines. * *

"In the year 1862, the Compagnie du Midi, headed by M. Pereire, commenced the construction of a winter town in the forest. * * * * *

"The residents in these villas enjoy an almost perfect protection from wind, and, in the spring months especially, a highly balsamic atmosphere. The air of the forest seems to be particularly suitable to persons of a nervous temperament, whom it soothes and calms. The stillness of the air, and character of the scenery exercise as beneficial an effect upon these, as they exercise a depressing and injurious influence on others who require more bracing air, and greater variety

of scene. The latter are better nearer the sea, but there the winds are colder, and more violent than in the forest; so if one require a very warm, and yet a bracing air, he should not visit Arcachon till the spring, when he can spend most of his time on the sea shore.

"The want of variety is much felt by some of those who are ordered to Arcachon; and those who cannot do without it, need not think of passing the winter there. For those, however, who have their families with them, and who have resources in themselves, Arcachon offers a quiet, agreeable, and remarkably healthy place of abode.

"I have very high medical authority in stating that the effect produced by the climate of Arcachon upon many invalids who have tried it, particularly on those who have remained there for a considerable time, has far exceeded the most sanguine expectations of their friends and physicians. Dr. Hudson, of Dublin, will pardon me for repeating what he said to me when I called on him to thank him for having sent me there. 'I do not know any place which returns me so large a percentage of favourable cases as Arcachon.'

"It generally agrees extremely well with children who can play about in the sand to their hearts' content. * *

"There are at Arcachon four French physicians, and one English. There are two *pharmacies* in winter and three in summer."

XIII. — TEMPERATURE AT GREAT HEIGHTS.

"Medical Record," *October 14th*, 1874.

"Professor Wahl, who accompanied Professor Wise in a recent balloon ascent, gives the following account of the temperature experienced: — 'The *maximum* temperature observed was 97° at starting, and this continued at 1,300 feet. At 2,000 feet it was 96°; at 3,800 feet, 85°. The fall went on until, at the greatest altitude attained—viz., 8,743 feet, the temperature was but 68°. It fell gradually as we descended, but was lower than in the ascent, owing, doubtless, to approaching twilight and the attendant lessening of the sun's power.' Observations were also made with a view to estimate the quantity and quality of any mechanical or other impurities of the atmosphere, but it will require some little time and careful work before any information on this point can be made public."

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C.

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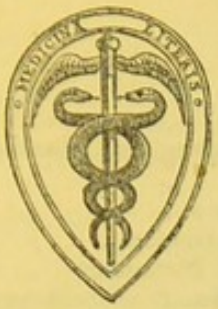

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