country, provided hygienic principles be carefully applied to the important matters of air, water, food, clothing, exercise and rest, employment and amusement, so far as these can be regulated with due regard to the exigencies and necessary discipline of the public service. We have seen how, not only in such favoured climates as the Cape of Good Hope and Mediterranean, but in remote regions, as the highest Antarctic latitudes, in the Red Sea, the West Indies, and in Northern China, the very highest standard of health and lowest mortality can be maintained for considerable periods, while even on such trying stations as the West Coast of Africa, Central America, Bengal, Ceylon, and Southern China, sickness may be kept down to as low a figure, and mortality and invaliding to even a less ratio than is found in the home service.

The chief exceptions I have had occasion to note as occurring in the Baltic in the first year of the Russian war, and in Central and Southern China in our last war with that empire, could be fairly accounted for. In the first instance, the physical character of the men was far below the average. Hurriedly recruited on the sudden outbreak of hostilities, often of unsound constitution, and not inured to hardship, they were exposed to incessant and most laborious duty in keeping the sea and blockading the Russian ports in the most inclement season of a wretched climate. Most of these men were ill-fitted to bear the fatigues and perils of war, which are always more trying in the form of sickness than of combat; and, in the first Baltic campaign, they suffered greatly from disease.

In the second instance, in China, a body of men who had been originally of exceptionally good physique, but tried by two years' continuous service in the tropics, and still more by the dissipations of Hong Kong, made a sudden and disastrous plunge into war with more than its usual horrors. They were immediately after exposed to the deadly climate of the Yangtse in the hot season, with spirits depressed by our heavy losses in action, and were less able to encounter the epidemic diseases which assailed them. To this may be added various privations, to some extent unavoidable, and one of the most important of which was that of the pure distilled water they had been so long in the habit of using, both for drink and ablution, and with so much advantage before their arrival on the China station.

Too much attention cannot be paid to such details, all important in maintaining the health and efficiency of mariners. The Royal Navy of England has been a grand school of public hygiene for more than two centuries. Nowhere can experiments of the life-saving class be carried out more perfectly, and on a larger scale, than afloat, where all are circumstanced alike in regard to climate, food, clothing, exercise, and discipline. As the terrible scourges of typhus, dysentery, malignant ulcers, gangrene, and scurvy have long been banished from our home-fleets, so we may look confidently forward to the time when such minor evils as still exist, chiefly on foreign service, shall also disappear, and when that important section of our countrymen who form the first line of our national defence, and protect our world-wide colonies and commerce, shall enjoy as perfect a sanitary condition as can possibly fall to the lot of humanity.

Had time permitted, it was my intention to conclude, by way of contrast, with a short summary of professional work in London during the last twenty-three years, among a body of men differing from seamen in being of maturer age, averaging thirty-seven years, and in having the comforts of home life in our temperate climate, with not more exposure to the weather than falls to the lot of most middle-class citizens actively engaged in out-door employment between the ages of 20 and 65. Some years ago, in 1875, I presented, at the meeting of the Association at Edinburgh, a statistical paper on this subject, with reference chiefly to the important matter of mutual insurance against pecuniary loss from sickness, a matter ably handled by Sir James Paget, in his admirable address at the opening of the Health Exhibition last year, and which now possesses very considerable interest to our Association in connection with the well-matured scheme lately launched, and making, I rejoice to hear, very satisfactory progress. My experience is necessarily limited to a small section of the population; but the personal observation and records of 15,000 cases of illness have enabled me thus to summarise the ratios of disease as occurring among adult males in this metropolis.

Of 1,000 men, such as I have indicated, you may expect 40, or 4 per cent. to be daily incapacitated by sickness, accident, or infirmity; 12 annually to die, and 16 to become permanently incapacitated by age or chronic illness; and a loss of time, for each individual, from all kinds of incapacitating ailments, of 12 days *per annum*.

Of the various classes of disease, those of the respiratory organs were found to constitute 28 per cent. of the whole amount of sickness, rheumatism and gout, 14 per cent.; disorders of the digestive organs, 17 per cent.; nervous diseases, 9 per cent.; accidental injuries, sin-

gularly uniform in their proportion, 10 per cent. Disorders of the skin and cellular tissues, and other so-called surgical maladies combined with accidents, form 25 per cent. of the whole.

Zymotic diseases, comprising the various forms of fever, contribute the very small annual average of 6 per cent.; and, although many of these officers spend much of their lives on board vessels arriving in this great port from all parts of the world, no instance has occurred, in all these years, of any of them contracting disease of infectious character on board.

TWO LECTURES

ON

CHRONIC LARYNGITIS AND CHRONIC PHARYNGITIS: THEIR PATHOLOGY, SYMPTOMS, AND TREATMENT.

Selected from a Course of Lectures delivered during the Winter Session of 1885, at the Glasgow Royal Infirmary.

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LECTURE I.

GENTLEMEN,—In my last lecture, I called your attention to some of the acute diseases affecting the larynx and pharynx, and pointed out to you that not unfrequently, if proper treatment be not adopted during the earlier stages of the disease, acute or subacute inflammatory conditions may be followed by certain chronic histological changes in the mucous membrane and other structures of the parts. But, while it is true that chronic affections of the upper air-passages may be the sequel of previous more or less acute attacks, in the great majority of cases their commencement is insidious, and cannot be easily referred to such causes.

In their etiology and pathological anatomy, chronic pharyngitis and chronic laryngitis are so intimately connected with one another, and the diseases are so frequently associated together, that they may be very conveniently considered under one heading, while the symptoms, prognosis, and treatment will be illustrated by cases, and discussed separately.

I will, in the first place, occupy a few moments in the consideration of the etiology of chronic laryngitis and pharyngitis. You will meet with these diseases most frequently in adult males; females and children are not so commonly affected. They are less likely to be exposed to vicissitudes of weather, irritating gases, etc.; and, as a rule, greater demands are made upon the vocal organs of men, many of whom, such as clergymen, public speakers, schoolmasters, street-criers, etc., require habitually to overexert their voices.

Amongst the patients suffering from chronic catarrh who apply for relief at the out-door department for diseases of the throat at this hospital, the cause of the disease is, in many cases, easily traced to their occupation. Persons who are required to work in impure atmospheres, such as steel-workers, coal-miners, bone-grinders, or persons who are exposed to irritating gases, or who require to work in badly ventilated apartments, are very liable to the diseases we are at present discussing. Their etiology is also intimately connected with certain climatic conditions. At one season of the year, the symptoms may entirely disappear, while at another they may become greatly aggravated. With the return of summer, and a visit to the country or the seaside, the symptoms may remain in abeyance, only again to reappear when the patient, neglectful of former experiences, returns to his old mode of life. It may require but the first fogs of autumn to remind him of his former ills, either by an acute attack, or by an exacerbation of the symptoms. By every relapse, the liability to another attack is increased. I think it is undoubted that the structural changes produced by one attack of catarrh predispose to another: that is to say, the hyperamia, swelling, and increased secretion which essentially constitute the phenomena which we call catarrh, after they have reached a certain pitch, tend to remain constant; the power of resistance of the mucous membrane is diminished thereby, so that, when it is submitted to the influence of an irritant, they are easily

raised to the level of a catarrhal inflammation. In other words, the patient becomes predisposed to catarrh. The more frequent the attacks, the more susceptible does the patient become, and the less likely he is to make a good recovery.

It is therefore of the utmost importance, when a patient shows a tendency to catarrh, to use every means in your power to prevent attacks from being repeated, even though they may be at first comparatively mild. In some cases of acute catarrh, as I mentioned to you in my last lecture, chronic changes may become established, even though the symptoms of the acute attack have subsided without being either severe or protracted, and have permitted the patient to resume his occupation without inconvenience. Such cases require to be carefully watched.

Now, gentlemen, while we must regard local causes as of the greatest importance, we cannot overlook the fact that chronic catarrh is, in certain cases, a local expression of a constitutional condition. There is present in some patients a debilitated state of health, which determines the persistence of the affection from which they suffer, even though the greatest care be taken to prevent local irritation. The strumous diathesis, rheumatism, and certain nervous affections predispose to the form of inflammation of which I am now speaking.

When these conditions are known to exist, it is of the greatest consequence that the patient should be taught to avoid all conditions which are likely to cause an exacerbation of the symptoms. Probably the most common causes of a fresh attack are exposure to wet, or a sudden alteration in the temperature of the surface of the body. Sudden elevation of temperature, as well as rapid lowering, may cause an attack of catarrh. Exposure to cold currents of air, getting the feet wet or cold, confinement in overheated or badly ventilated rooms, exposure to the heat of the sun, or inhaling dry air, may act as exciting causes in those predisposed to catarrh, and should, therefore, be carefully avoided.

Every one of you must have observed how at different times you are differently affected by exposure to cold, by getting a wetting, by errors in diet, by overwork, etc. At one time you escape unhurt, while at another you suffer from deafness, tonsillitis, nasal catarrh, acute pharyngitis, or laryngitis, or perhaps acute gastric catarrh; and, again, while some of you may find it necessary at all times to avoid exposure to such influences, others may be subjected to them without any evil effects.

Let us now consider very shortly the pathology of chronic pharyngitis and chronic laryngitis, and see in what respects the diseases correspond with and differ from one another. We may also endeavour to classify the various forms which these diseases may assume.

In a former lecture, while considering the normal histology of the pharynx and larynx, I pointed out to you that the mucous membrane of the pharynx may be divided into two very distinct regions. Above the posterior pillars of the arch of the palate, the mucous membrane is invested with a ciliated cylindrical epithelium, and contains a large number of glands. Below the posterior pillars, the mucous membrane possesses rudimentary papillae, and is covered with pavement-epithelium, like that of the mouth. Mucous glands are numerous over the whole posterior wall of the pharynx, and are easily seen with the naked eye. The epiglottis and the true cords are covered by stratified pavement-epithelium, while the rest of the laryngeal cavity is lined by cylindrical cells with vibrating hairs.

The mucous membrane covering the arytenoid cartilages is very rich in glands, and, on account of the constant movement of the cartilages during phonation, the mucous membrane and the glands contained in it are more apt to be subjected to undue irritation, and, as a result, the structures are liable to undergo a process of enlargement.

When speaking of acute catarrh, I indicated the histological changes produced, and stated to you that catarrhal inflammation of the mucous membrane was characterised by an initial hyperæmia, and subsequent swelling of, and increase of secretion from, the mucous membrane, as well as by an inflammatory enlargement of the lymph-follicles. The swelling of the lax submucous areolar tissue is doubtless largely due to the engorgement of the blood-vessels, and to œdema; but it is equally obvious that the increase in bulk of the mucous membrane in chronic cases does not arise from these causes, but is due, in great measure, to a proliferation of cells in the subepithelial connective tissue. If the inflammation be intense, it may lead to a necrosis of the superficial layer of the mucous membrane, and an ulcer may be the result; or resolution may be established by the infiltrating cells migrating towards the surface, or disappearing by lymphatic absorption. Where, however, the irritation is long continued, and the inflammation has become chronic, the cells of the connective tissue proliferate, and develop into fibrous tissue, while, at the same time, the mucous glands enlarge; and, as a result, vegetations, papillomatous outgrowths, or

cysts, may form, and the epithelium at the same time becomes modified, so that the parts which are normally covered by cylindrical ciliated cells come to be covered by stratified or squamous epithelium.

The increase in bulk of the follicular glands is not a true hypertrophy, but is due partly to an accumulation of secreted matter or of inflammatory products, and partly to a hyperplasia of the surrounding connective tissue. The contents of the glands may soften, and form minute pseudo-abscesses, which discharge, and leave small follicular ulcers. The swelling is usually marked by a ring of hyperæmic circumfollicular blood-vessels, while the glands themselves are pale dull grey, and vary in size from that of a pin-head to that of a small pea. The condition I have just described is frequently met with in chronic catarrh during the early stage; but, when the disease has been established for some years, the pressure exercised by the new connective tissue developed in the submucous layer induces atrophic changes in the glandular structures, or, by preventing the exit of the secretions, may cause the glands to dilate, and so cysts are formed.

When the development of connective tissue extends to a marked degree, fibrous bands, plates, little nodules, or even vegetations, which come to resemble tumours, may result. These inflammatory new formations are very common, both in chronic pharyngitis and in chronic laryngitis. New gland-tissue may doubtless also be formed; but, as far as my observations go, the bulk of such growths is made up of fibrous tissue, there being, if any, only a slight increase in the proper glandular elements. These formations should, therefore, be carefully distinguished from such non-inflammatory new formations as adenomata, etc.

From what I have just said, you will now understand why it is that chronic catarrh of the laryngeal and pharyngeal mucous membranes is, above all other causes, the most common in the production of new formations, inflammatory or non-inflammatory. Non-malignant growths frequently originate in acute and subacute forms of inflammation; but, while this is true, I think I am safe in saying that a very large proportion of the growths formed in the upper air-passages are essentially inflammatory in their structure, as well as in their origin, and should not, therefore, be designated tumours in the strict sense of the term.

It is only in the tonsil that hypertrophy, in the proper use of the word, is caused by chronic catarrh; it arises from an uniform increase in the histological elements of the gland; and so a smooth regular projection is formed, which must be carefully distinguished from the enlargement of the tonsil following repeated attacks of acute tonsillitis, in which the increase in bulk is due to fibroid induration of the organ. In the former condition, the tonsil is smooth on the surface, globular, and often pedunculated; even the depressions, which correspond to the orifices of the crypts, are effaced, and on section the tissue of the enlarged tonsil is soft and friable; whereas in the latter it is firm, and cuts with a creaking noise, the depressions of the crypts are unduly marked, and the surface is irregular.

Until now, gentlemen, I have confined your attention to the structural changes produced by prolonged inflammation; I have said nothing about interference with function. When, however, you consider the structural changes, it is at once evident what the changes in function must be. For instance, the hyperplasia of the mucous membrane and submucous tissue will cause the mucous membrane to be fixed and rigid, and so lead, in chronic pharyngitis, to pain or difficulty in deglutition; or when the larynx is involved, the movements of the delicate structures which form the laryngeal apparatus may be so interfered with that almost complete aphonia may result. In one of the cases which I will show you after the lecture, the interarytenoid fold has become so indurated as to prevent approximation of the cords, while in another case the ventricular bands have become swollen and thickened, and prevent the movement of the true cords, by offering a direct mechanical impediment to their approximation.

Again, the hyperæmia, enlargement, and tortuosity of the small vessels supplying the mucous membrane, lead to a diminution in the quantity, and an alteration in the composition, of the mucus secreted. This is a consequence of functional inactivity of the mucous and follicular glands; and, so you find that one of the first symptoms complained of by the patient is dryness of the throat, accompanied by a sense of pricking and heat, and a dry harsh cough, without much expectoration, unless the laryngeal and pharyngeal affections be complicated by bronchial catarrh. The mucus secreted is usually very viscid, and occasionally, when expectorated, is streaked with blood.

As a consequence of the alterations, which I have described as occurring in the epithelium, the cylindrical ciliated epithelium becoming replaced by stratified and squamous cells, there is a tendency for plugs of mucus to become lodged in certain localities, instead of being

propelled upwards by the cilia, and they are only expectorated after much coughing or "hawking."

Chronic catarrh of the upper air-passages may be conveniently described under three varieties:

1. Simple chronic catarrh, with increase in bulk of the mucous membrane, or what is sometimes called hypertrophic catarrh;

2. Catarrh in which the follicular glands are specially involved, or follicular catarrh;

3. Chronic atrophic catarrh, in which the mucous membrane is greatly reduced in bulk and the glandular structures are atrophied.

This classification may, I admit, be somewhat arbitrary, and cannot be applied in all cases; for, as a general rule, the various forms merge imperceptibly into one another. Even though this may be the case, I am certain you will appreciate the value of this classification when you come to deal with cases in your own practice, as it is of special value in connection with treatment. It is upon an accurate appreciation of the structural changes associated with each form of disease that your diagnosis must rest, and that the mode of treatment which you adopt depends.

To illustrate what I have said, I have brought three cases from the ward, and I will demonstrate them to you after the lecture. One is an example of simple chronic catarrh, affecting both the larynx and the pharynx; the second is a patient suffering from follicular catarrh; while the third is a man who has long suffered from laryngeal symptoms, and whose larynx now presents the characteristic appearances of chronic atrophic laryngitis. You will have an opportunity of seeing these cases after the lecture; but in the meantime I may read you a short note of the history of each case, and indicate to you what you should look for when examining them with the laryngoscope. After describing each case, I will indicate to you the local treatment which should be adopted, and, in doing so, I will only state the remedies I have found to be most beneficial, and shall not trouble you by enumerating all the different agents you might employ. At the end of the lecture, I will say a few words regarding constitutional treatment.

The case which I now show you is one of chronic pharyngitis and laryngitis, with increase in the bulk of the mucous membrane, or what is usually erroneously called hypertrophic catarrh of the larynx and pharynx. When this man came first under my observation, there was marked thickening of the pillars of the fauces, the soft palate was swollen, and the uvula elongated; the tonsils also were slightly enlarged. The posterior wall of the pharynx was uniform, and soft to the touch. The vessels supplying the mucous membrane were large and tortuous, and the surface of the membrane was covered by a layer of thick viscid mucus. The epiglottis was swollen and congested, and it was with considerable difficulty that a satisfactory examination could be made of the larynx. The laryngeal mucous membrane was found to be thickened and indurated, and the ventricular bands were so swollen that they completely overlapped the true cords, and concealed them from view. There was no indication of ulceration or erosion of the epithelial layer of the mucous membrane.

The history of this case is, that the patient has suffered from repeated attacks of catarrh during the last six months, associated with aphonia, dyspnoea, and difficulty in deglutition, accompanied by severe paroxysmal cough, with more or less profuse expectoration of viscid mucus, sometimes mixed with blood. On admission, there was no evidence of general constitutional disturbance.

After being in the ward for a fortnight, a note to the following effect was made in the journal. "The uvula and tonsils are now reduced in size, but the thickening of the false cords still persists, although the voice is improved; and, according to patient's statement, the pain in the region of the larynx, from which he suffered on admission, has now almost disappeared, and the cough has greatly improved."

Until the present time, I have been unable to make a posterior rhinoscopic examination, and therefore I have no information to give you regarding the condition of the postnasal space; but in a few days I hope to be able to show you the condition of the parts contained in it.

Usually, in this disease, the mucous membrane of the naso-pharynx is involved, and presents very much the same appearances as the lining membrane of the larynx and pharynx; there is also, in these cases, a tendency to hypertrophy of the pharyngeal tonsil; and, if the catarrh be of long standing, the inferior turbinated bones may also participate in the general tendency to enlargement. These conditions must be carefully looked for in all patients you examine, for, by failing to grasp the whole aspects of the case, your treatment may be rendered useless.

Now, gentlemen, what is the treatment you should adopt in a

case such as the one I have just described to you? The tendency in this form of catarrh, is to an accumulation of secretions, which, if allowed to remain, naturally act as local irritants; it is therefore necessary, whether the seat of the inflammation be the larynx, the pharynx, or the postnasal space, in the first instance, to employ applications which will cleanse the mucous membrane of the part. This is best accomplished by means of warm sprays, unless the patient suffer from dyspnoea, in which circumstance the use of the spray is contra-indicated, and steam-inhalations should be employed till the local irritation has become diminished.

The formula I usually employ for the spray is as follows. *R* Soda bicarb., $\mathfrak{z}\text{i}$; acidi carbol., gr. xx ; glycerini, $\mathfrak{z}\text{ss}$; aquam ad $\mathfrak{z}\text{iv}$. *M.* This spray should be used at least three times a day, until the mucus has become reduced in amount and healthy in appearance. In some cases, particularly in those where there is much local irritation with dyspnoea, during the early stage, great relief is derived from the employment of vapour-inhalations containing either hydrocyanic acid or benzoic acid, and tincture of Tolu. You may prescribe the hydrocyanic acid as follows. *R* Acidi hydrocyanici dil., $\mathfrak{z}\text{i}$; aquae, $\mathfrak{z}\text{i}$; a teaspoonful in a pint inhaler, the water in which is heated to 90° Fahr.; and, in ordering the inhalation of benzoic acid and tincture of Tolu, you may direct three grains of the former, and eighteen drops of the latter to be placed in the inhaler. When the secretion of mucus is considerable, it is advisable to use ether and spirits of turpentine, with the agents I have just mentioned; and perhaps as good a combination as you can employ, is the one I now give you: *R* Ether, spirits of turpentine, benzoic acid, $\text{aa } \mathfrak{z}\text{ss}$; balsam of Tolu, $\mathfrak{z}\text{ii}$.

If there be much local irritation of the mucous membrane, remedies should not be applied by means of the brush; in fact, the brush should be employed as seldom as possible, seeing that most agents may be easily applied either by Hartewelt's drop-injector, by the spray, the inhaler, or the insufflator.

As soon as the desired effect has been obtained by the use of the alkaline spray, the pharynx or larynx should be sprayed with a solution of perchloride of iron. The following formula you will find convenient: *R* Perchloride of iron, $\text{grs. } 36$, glycerine $\mathfrak{z}\text{iv}$, water to $\mathfrak{z}\text{x}$. *M.* To be employed three times a day. In this form of catarrh, I have found it of advantage not to employ strong solutions, and also to avoid, as far as possible, irritation of the mucous membrane by the frequent introduction of instruments. In fact, it is of the greatest advantage to the patient to give the parts as much rest as possible, and adopt a treatment that will cleanse the mucous surface, allay irritation, and restore the functions of the glands.

Combined with local remedies, it is well to administer tonics internally, such as iron, strychnia, and sulphate of quinia; and you will find the employment of carbonate of ammonia, with spirits of ether and infusion of senega, of great value in such cases as the one I have just described to you.

In cases of chronic catarrh, with thickening of the mucous membrane, the patient may derive considerable benefit from the use of blisters; but, in order to get full advantage from them, it is not necessary to use a large blister, but rather to order small blisters to be applied frequently. My custom is to direct the patient to put on a fly-blisther, of the size of a shilling, over the larynx every second night, and to keep it on till morning. This should be continued for ten or twelve days, each blister being placed on a different part of the neck.

The second case which I wish to bring before you is one of follicular pharyngitis; I will postpone the consideration of the details of this case, and of the third one, till next lecture, but I will demonstrate the appearances observed on laryngoscopic examination now.

THERMIC DYSPNOEA.—Numerous experiments on dogs have led M. Richet to some interesting conclusions, which have been recently communicated to the Académie des Sciences. When general tetanus is produced in a dog by powerful and repeated electrical stimuli, the temperature soon rises; and, when it goes beyond 40.5° Cent., the frequency of the respiration is increased. This central thermo-dyspnoea is caused, according to M. Richet, by the action of heat on the nervous centres. By the application of cold water to the skin, the frequency of the respiration can be diminished, but for a short time only, unless the temperature has become inferior to 40.5° Cent. Dogs exposed to a temperature of 40° Cent. soon begin to breathe very rapidly, though the temperature of their body remains normal. M. Richet is of opinion that in this case the frequency of the respiration is caused by reflex action. This reflex thermo-dyspnoea can be prevented by the administration of chloral, and stopped by the application of cold water.