A Clinical Lecture

ON

COUGH AND ITS SIGNIFICANCE.

Delivered at the Medical Graduates' College and Polyclinic.

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THE subject that I have chosen to-day to talk to you about is an exceedingly common one, and, I must admit, also very frequently troublesome to treat. When I first gave Mr. Pinch my subject I thought it would be a fairly easy one to bring into manageable proportions, but the more I looked at it the larger I found it was.

I would begin by remarking that cough is very like pain in one respect; it is a signal that something is irritating a nerve or nerves. In the case of pain the irritation may be anywhere. In the case of cough it is primarily an indication of irritation of a branch of the vagus nerve, though cough may arise occasionally from other sources, as we shall see. To get a sound basis for estimating what and where that irritation is it is necessary to analyse cough: first, in regard to its mechanism; and, secondly, in regard to its causation and treatment. Cough, then, may be defined as an abnormal respiratory process produced by a stimulus reaching a centre, a process which has, moreover, for its object the removal of the stimulus. The importance of this will be seen later in talking of treatment.

It is stated in works on physiology that such a centre has been localized close to the respiratory centre. It is tolerably obvious that such a centre does exist, for the process of coughing is a very complicated one, and there must, therefore, be a great saving in labour if the messages can be controlled by cells which are in close connexion.

THE PROCESS OF COUGHING.

The actual processes in the act of coughing are: (1) An inspiratory effort followed at once by (2) a closure of the vocal cords, in turn followed by (3) violent expiratory efforts in which (4) a sudden opening of the rima glottidis takes place. The chief difference between an ordinary deep respiration and cough lies in this approximation of the vocal cords till the air pressure in the lungs and bronchi reaches a considerable height, sufficient to suddenly force them open and thereby carry with the gust of air the offending material that excites the cough. How high this pressure may reach at times is shown by the lesions in the lung that may be produced by it, either by a sudden considerable increase in the pressure, or by long-continued slighter increase. For instance, sudden rupture of an air vesicle has been produced with consequent pneumothorax in an otherwise healthy chest, and emphysema occurs in the slighter forms of a cough which is long continued. How important this closure is, is seen in the ineffectual cough of cord paralyses which we shall mention presently.

COUGH AND THE VAGUS NERVE.

Cough may be and often is, as in the physical examination of the chest, when one asks a patient to cough, a purely voluntary procedure. But we must assume here either an abnormal stimulus from a surface or an abnormal condition of irritability of such surface. The palate, pharynx, larynx, bronchial tubes, and pleura are the usual seats of such stimulus or irritability, but other regions and even the skin may be at times the source of a cough. A complete analysis of all the possible sources of cough involves an examination of all the surfaces to which the vagus is distributed, and all the possible irritants to which those surfaces might be exposed. The branches of the vagus are as follows:

1. A small branch to the meninges, which has no interest for us at present because I know of no case of cough produced by such means. The vomiting which takes place in meningitis is probably produced through that same branch by stimulus of the vagus.

2. A small branch—Arnold's or the auricular branch—distributed to the back of the pinna of the ear and probably also to the external meatus in part, for a cough is certainly produced from an affection of the external meatus. All of you most likely have met with cases in which the removal of a plug of wax from the ear and the curing of a little external ear discharge has completely relieved a cough which has been a puzzle as regards its causation.

3. A branch to the pharynx joining with other nerves round the oesophagus. This nerve is certainly a source of cough in pharyngeal cases.

4. The superior laryngeal branch distributed as a sensory nerve to the base of the tongue, the epiglottis, and the larynx, irritation of which probably produces as many cases of coughing—not due to distinctly pulmonary disease—as all the others together. That is the most important branch to remember.

5. The inferior laryngeal branch supplying motor powers to the muscles of the larynx, and therefore important in carrying out the movements in cough, but it has also a few sensory fibres.

6. The cardiac branches, possibly of some interest to us, but cardiac cough is more probably due to muscle failure with back pressure and irritation to the lungs with excessive secretion.

7. The pulmonary branches concerned in the cough of gross pulmonary disease such as tubercle, growths, etc., and possibly in the cough of pleural disease in its visceral layer.

8 and 9. The oesophageal and pericardial branches, not of much clinical interest, as cough in these diseases is due generally to pressure on the trachea and larynx or to associated pleurisy. I know nothing about oesophageal cough or pericardial cough.

10. The gastric branches and branches to other abdominal viscera. They come within our present purview because one is very definitely acquainted with the cough which arises from gastric disturbances in the shape of forms of dyspepsia.

COUGH IRRITANTS.

The irritants to which the surfaces may be exposed may be briefly classified into: (1) Foreign substances, such for instance as tobacco smoke, dust, etc.; (2) excess of natural secretion which is a very common event in inflammatory troubles; (3) pressures and inflammation; (4) acute, or chronic and simple debility, or increased irritability without obvious change in structure so far as the naked eye is concerned. This question of increased irritability is exceedingly important because there can be no doubt about it that many people coming to you would call themselves in perfect health except that they are troubled with "a beastly cough" every time of going out of or into a warm room, in fact with every change of temperature. Examine them as much as you like and you find nothing. The condition is simply one of increased irritability, and it occurs particularly after influenza and other debilitating diseases. Every now and again one sees some practitioner hopelessly at his wit's end to know what to do with such a case, and I do not know that I can give him anything that will cure such a case with ease and certainty.

COUGHS AND THEIR CAUSES.

Many classifications of cough might be given, but one of the simplest and most useful is to divide them boldly into two classes only, namely, (1) the cough useful and (2) the cough ornamental or useless. Provided we are aware of the causes which may be, or rather are, giving rise to a member of either class I know of no better classification. Indeed in dealing with the treatment of a cough this must be our guiding principle. The cough that is useless should if possible be checked, whereas the useful cough should be encouraged. In attempting to discover the cause of any particular cough we must, however, give a more systematic list of the possible causes to be looked for, that is, from a clinical point of view, a list of diseases. Keeping to an anatomical order we may then enumerate them.

1. *Ear.*—The principal causes of cough here are plugs of wax and chronic catarrh of the external meatus. If not complained of these are likely to escape notice unless a systematic examination of the patient is made, when they at once become obvious if an examination is made of the ear. As a direct cause of a cough they are, so far as my personal experience in practice is concerned, rare, but in talking with one's aural friends they are apparently not so rare as one would be led to suppose. Our aurist tells me he often sees patients whose principal complaint is first of all that of being a bit deaf, and then such a patient will say "It is not the deafness that worries me so much as that horrible cough." And the cough ceases with treatment of the ear.

2. *Pharyngo-tonsillar Troubles.*—These include: (a) A long pendulous uvula; this is one of the most common causes of a cough that occurs with unfailing regularity when the patient lies down; (b) chronic catarrhal pharyngitis, with small nodules of adenoid tissue to be seen, and patches of excessive vascularity; (c) chronic tonsillitis or adenoids must not be forgotten in this connexion; and also (d) acute inflammation of some parts of the pharynx and palate. Inspection of the mouth with a simple spatula will commonly reveal any of these conditions; their presence is usually suggested by hawking being a prominent complaint with the cough. The patient coughs and hawks to get his pharynx cleared. A friend of mine is troubled in this way, and here I might mention that the only way of treating such cases is to have these

slight patches of adenoid tissue cauterized. Periodically about once a year, when he gets an extra bad attack, my friend goes to Sir Felix Semon, who kindly burns it for him. He is better for a few months, and then he begins to cough again. The sputum in these cases is usually rather characteristic; it comes up in small pellets not infrequently mixed with a little blood—an important point, because haemoptysis in the mind of the public is almost synonymous with consumption. But it is our business to be aware that such haemoptysis is very frequently not due to tubercle. I think that not more than 50 per cent. of haemoptyses are due to tubercle.

I put into this group the specific febrile diseases, because they belong to the same branch—namely, the pharyngo-oesophageal—or the vagus. A sore throat with cough often ushers in an attack of measles or even of scarlet fever or of rheumatism, and in pertussis or whooping-cough the pharynx and upper air passages seem to be the seat of the infection. In the treatment of pertussis some methods are directed entirely to what we may speak of as antiseptic cleansing of the back of the throat, palate, and larynx, such as having an antiseptic burning in a candle. Diagnosis here rests largely with the thermometer and other complaints of feverishness, with aching in limbs or head. In pertussis the evidence will rest on the age of the patient, or on a history of possible exposure to infection in an adult. One is rather apt to overlook whooping-cough in the case of an adult. I had a case not long ago in which a father and his three children were down with whooping-cough, and really he was very ill with it; he could get very little sleep. When dealing with coughs in general, it must not be forgotten that cough in the early days of pertussis has not yet acquired the characteristic whoop.

Diphtheria belongs to this class before it has attacked the larynx, and in young children who are hardly capable of complaining of sore throat this possible source of a cough must never be overlooked. A mother brings a child to you and says: "It has been coughing for the last day or two and I want you to examine it." The child does not appear to be very ill, because diphtheria does not always start in a malignant way. But it is very necessary that you should look at the back of the throat—I know the difficulty of that—because of the possibility of the case being one of diphtheria.

3. *Laryngeal and Tracheal Troubles.*—These form an enormous group which one must classify in some sort of way. I do not pretend to tell you that the following is the best way to classify them, but it is a very useful method: A, A gross local visible lesion; B, a gross local loss of power in the cords; C, no visible changes or very slight ones.

With regard to the first of these three groups, A—a gross local visible lesion—you have tuberculous, syphilitic, and malignant ulceration. None of them are very rare, and all have to be thought of. Then you have acute inflammation, which is a gross local visible lesion; acute inflammation may be due to a simple cause, a simple laryngitis, or it may be again specific—that is to say, either diphtherial, tuberculous, or syphilitic. Again, the inflammation may be due to a foreign body, of which I had an example only three days ago in the London Hospital. A girl of about 16 years of age came in complaining of a cough, and the sputum which she brought up was very offensive. She then developed pleurisy, and ultimately in the *post-mortem* room we found half the shell of one of those so-called "monkey nuts," which had caused extensive consolidation of the lung—in fact, gangrene. Well, then we have also papillomata of the cords not to be forgotten as a possible cause, more common in children but also found in adults. The German Emperor probably has papillomata of the cords.

In the second or B class of laryngeal and tracheal troubles—gross local loss of power in the cords—any of these ulcerations that I have mentioned above might cause paralysis of the vocal cords if the infiltration be sufficiently deep, but in the majority of these coughs the loss of power in the cords is due to pressure on the recurrent laryngeal below in the thorax. Of course, the causes of pressure are as numerous as the causes of swelling. Glands, carcinoma, sarcoma, lymphoma, aneurysm must none of them be forgotten as possible causes of cough, and they require to be looked for as otherwise they may not suggest themselves.

We now come to C, or the third of these groups, which is a very important one, namely, no visible change to be seen, or only very slight ones. I have divided this up into two. First, a condition chiefly of local excessive irritability, pos-

sibly associated with slight visible changes, congestion, etc. For instance, after influenza and other debilitating diseases you get a cough lingering for months and no treatment seems to touch it. Then from excessive use (by hawkers and public speakers, etc.) a nasty irritable condition of the larynx arises which requires to be treated from the point of view of checking the cough. You get just the same thing in old alcoholics and again from tobacco. I am a smoker myself and I can quote my own experience. I can usually stand a considerable amount of smoking, but I had an attack of influenza a few weeks ago, and for a fortnight afterwards I could not touch tobacco; it started a cough immediately simply from local irritability, the tobacco smoke acting as an irritant. There is precisely the same remark to be made in regard to dusty occupations. In middle-aged and elderly men there is a form of irritability which must not be overlooked—a gouty condition of the larynx. I do not know that there are any changes to be seen, but the possibility of gout has to be considered in connexion with this excessive irritability.

The second condition that I have put down in connexion with this third group, is a condition of pure reflex stimulus certainly without any visible changes. In such cases there is on the trachea a pressure which, though out of sight, causes cough. Of this I had a typical instance only the other day, the case of a man well known in society. He had a cough for which no explanation could be offered until about the third or fourth day, when he coughed up a table-spoonful of pus. A small abscess had broken into the back of his trachea and he coughed up the pus. The case rapidly proved fatal. Aneurysms do the same sort of thing. Then there may be pressure on the trachea as the result of enlarged glands. We know of that occurring in children. I had a case of cough in a small boy quite recently, which I put down to gland growth. I overhauled him very carefully and could find no visible cause. He had a few enlarged glands in the neck, and I thought there was probably gland pressure at the back of his trachea. Sometimes one reads of these cases of gland pressure on the trachea being diagnosed, but one can only guess at them.

4. *Pulmonary troubles*, which I have put down as another cause of cough, need hardly delay us much, since their diagnosis is generally easy. They include acute and chronic pneumonia, broncho-pneumonia simple and septic, tubercle which may be miliary or small, or it may be gross in either an early or a late stage. These are all too obvious to require much comment. Then there is simple bronchitis which may be acute or it may be chronic, in elderly people generally associated with emphysema. Besides simple bronchitis there are the complicated bronchial troubles such as bronchorrhoea, of which I know little as an independent disease, but it is met with from time to time. Then bronchiectasis which has its characteristic sputum, abscess of the lung, gangrene of the lung, hydatids, and other growths. These will all give rise to coughs, and can be diagnosed without really any very great difficulty if the chest be carefully examined.

5. *Pleural affections* form the next great group of causes. They are usually associated with pain. Of pleural affections you have acute pleurisy, which certainly may be dry, or it may be with effusion of simple serum or pus. Then you have your chronic pleurisy. We are rather apt to lose sight of chronic pleurisy; it is more often met with than is generally admitted, and it may be simple adhesions, or there may be definite thickening of the pleura. I saw an excellent illustration of that only this afternoon. The condition had come on after the removal of the right kidney twelve years ago. The wound had apparently suppurated, and the pleura at the base of the right lung was at least one-third of an inch thick. This good lady had had a great deal of cough, for which no explanation was forthcoming. Then, besides acute and chronic simple inflammations, there are all sorts of growths occurring on the pleura, both malignant and tuberculous, and any of them may give rise to cough or stitch in the side.

6. *Stomach troubles* are included in the last group of clinical causes. I know nothing about the kidneys or organs below the stomach giving rise to cough, but certainly one is well acquainted with gastric troubles and chronic dyspepsia of various types as causes of most obstinate cough. I say one is well acquainted with it. My reason is that one meets now and again with a patient who complains of a cough, and when asked, "When do you cough?" the reply is, "Directly after a meal. I feel so full that I begin to cough. Nothing seems to relieve it except that if I am sick the cough will stop." Upon several occasions I have met with cases of this description, therefore one must admit a class of gastric coughs. So

much, then, for a clinical list of causes of cough. It is obvious that in the time at my disposal, even if I had two lectures, I could not pretend to discuss the differential diagnosis of all these numerous causes of cough individually.

THE DIAGNOSIS OF CAUSES.

What I propose to do now is to suppose that we have a patient before us, and I shall go through an imaginary interview with him to show how one's field of diagnosis is narrowed down to probably a few only of the possible causes which may then be further investigated if necessary. I emphasize those words "if necessary." Just recently in the *BRITISH MEDICAL JOURNAL* there has been a considerable correspondence as to the treatment of pneumonia, and it struck me that all the correspondents who had ventured to criticize Dr. Lees (the original writer of the article) had left out the one point which seemed to me to be most seriously open to criticism in the whole article, and that is, the statement that you should examine the chest at least every day and sometimes even, he went so far as to say, twice or three times a day. I am certain that that is exceedingly wrong teaching. What I say is that when once you have got a definite diagnosis of pneumonia you can certainly inform yourself as to the progress of the disease by the temperature of the patient, by his statements, and by his general appearance. I am quite sure that the discomfort, to say nothing worse of it, to which you put him in making him sit up in bed whilst you examine the chest to see whether his pneumonia has gone another inch or two, is a bad thing for the patient, and is going a long way round to find out what can generally be ascertained by the shorter method of observation.

Let us see what aids we get toward diagnosing the cause of the cough.

The Age of the Patient.—In babies and quite young children most of the more unusual causes can be at once excluded by the mere fact of age. Bronchitis, broncho-pneumonia, tubercle, pneumonia, and whooping-cough are far and away the most likely causes, and if there be no temperature the last becomes at once the probable cause if we can exclude the presence of a foreign body; the possible presence of the latter is almost certain to be brought to the notice of the medical man by the mother, either with a direct history of her having seen the child put something in the mouth and start coughing or by a sudden fit of coughing in the midst of perfect health. A case which was brought to our notice the other day is rather apropos of this: A child perfectly well was left in the care of a man during the temporary absence of the woman who was nursing it, on her return she found that the child had definite laryngeal trouble with cough and it turned out that the man—he has got seven years penal servitude for it—had pushed a cork into the back of the child's throat. I have myself met with a somewhat similar case: A child was taken with violent fits of coughing after eating some soup. Inasmuch as what it had eaten was soup, I was misled and my experience may be of use to you, I said to myself the soup was probably too hot and the child had perhaps burnt its throat, and so excited a cough. It did not occur to me, I must admit, that here was a case in which there might possibly be a foreign body. The coughing was so paroxysmal and troublesome that I had the child taken to hospital, and there it died after tracheotomy, at which nothing was found, but *post mortem* I found a jagged bit of bone sticking in the child's larynx; this had come from the soup and had gone the wrong way.

In older children, from four years up to puberty, age in itself offers us but little guide, nor in fact do we get any assistance from age alone until, say, from 40 to 45, or from there onwards; at this period slight but persistent chronic bronchial troubles, quiet pleurisy and growths of all kinds, including aneurysms, come very much to the fore. One case made a very strong impression upon me, in which a young fellow, about 30, had been playing football on a Saturday; he was seen by a friend of mine on the following Tuesday or Wednesday. The young man said, "I do not know why I have come to you; it is only to please the mother." He was noticed to be a little bit short of breath, and had a slight cough, but beyond that nothing. One side of his chest was full of fluid, and several pints were drawn off; this is an illustration of quiet pleurisy.

Obvious Illness or Distress.—We may use the obvious illness to denote fever, loss of flesh, wasting, etc., and we may take distress to denote difficulty or rapidity of breathing and blueness of the face or lips. In the former case the cough will probably reveal itself by physical signs in the chest of some

acute inflammatory trouble or very possibly an advanced phthisis. An especial caution must be given to carefully examine the throat for a membrane of diphtheria or for an acute tonsillitis in cases where there is distress in connexion with breathing. Actual dyspnoea or difficulty in inspiration—mere shortness of breath is not necessarily dyspnoea—in young subjects is strongly suggestive of laryngeal obstruction. A little child is in obvious distress with a cough if the ribs or supraclavicular parietes are sucked in during inspiration; in such a case do not forget to think of diphtheria as a cause of laryngeal obstruction. In older subjects actual obstruction is much rarer, but the blue lips and obvious panting are strongly indicative of cardiac weakness as the cause of the cough or chronic bronchitis with extensive emphysema.

How long have you had the cough?—This is probably the first question that you will put to your patient, and much information may be derived from the answer. A cough sufficiently severe to worry the patient so far as to take medical advice, and which has lasted only a few days, is practically sure to belong to the group of "acute obvious disease" either in the mouth or chest. The more obscure causes—pressure, chronic laryngeal irritation, etc.—commonly give rise to a mere tickling in the throat with slight cough at first, and it is only when it has lasted for some time that it has caused sufficient alarm to necessitate or render advisable, in the mind of the patient, medical advice. Hence the duration of the cough is a very important point in diagnosis. If the cough has continued only for a few days the group of acute inflammatory troubles is suggested; if it has lasted some months it is probably due to a cause with gross physical signs in the chest or to a growth that needs some care to find.

Did it come on after a distinct illness?—Here we come to the group of infectious diseases—measles, influenza, scarlet fever—which are very liable to leave a cough; so also may broncho-pneumonia, pneumonia, or acute pleurisy. If you hear: "Yes, I have had pneumonia three months ago and have had the cough ever since," immediately you will say: "Has this pneumonia cleared up?" And you will examine the chest and listen to the area alleged to be infected. You may find some crepitations and perhaps tubular breathing. A differential diagnosis is then required between actual definite tuberculosis and the result of chronic pneumonia; this may mean that you will have to hunt for the tubercle bacillus. The cause of the cough, then, coming after a definite illness may be either chronic induration of lung or simple irritability of the larynx. I might mention here what I have found most useful in the treatment of laryngeal irritabilities left after infectious fevers. The following prescription I have found very successful: R Liq. morp., $\text{m}\times$; syr. limonis, $\text{m}\times$; glycerine, $\text{m}\times$; acid. hydrocyan. dil., mij ; syr. scillae, $\text{m}\times$; aq. ad $\mathfrak{z}\text{j}$, $\mathfrak{z}\text{j}$ pro re nata. The lemon, I think, is important; it has a little sharpness and acidity which seems in some peculiar way to relieve the irritability. It is important also that you should tell the patient how to take this linctus. Do not tell him to take a teaspoonful and swallow it as a medicine at once. It is perfectly true that the morphine is a little bitter, but the glycerine, lemon, and syrup of squills disguise that bitterness and make the linctus pleasant to take. Tell him to dip the tongue into the linctus and to swallow it slowly; he thus takes it in tiny sips, and by this means it will hang about the palate and the upper part of the larynx much better. If the linctus be swallowed very slowly some of it may actually get on to the epiglottis and those parts which are so very irritable.

When does your cough come on; what excites it?—A cough that only comes on when a patient is lying down is very suggestive of a relaxed uvula and laryngeal irritability. A cough coming on immediately he gets into bed at night is primarily suggestive of phthisis or of whooping-cough. But there is in addition a very important consideration to be here remembered, and one which has a strong bearing upon the treatment of cough in phthisis at an early stage; it is this. The temperature of a bedroom is usually much below that of the sitting room in which the patient has possibly spent his evenings; secondly, the patient undresses and exposes the skin to this lowered temperature; thirdly, he gets into sheets which are, and feel, much colder than the skin. Any one of these may, and frequently does, excite a fit of coughing which may last long after equilibrium of temperature between skin and bedclothes has apparently been established. Such a cough as this is usually caused by laryngeal troubles, acute or chronic. But, on the other hand, a cough which wakes

the patient up after he has got warm in bed—possibly asleep—is far more likely to be due to disease of the substance of the lungs. Malignant or other growths may do the same thing but tubercle is what you more especially suspect. Then in a little child whooping-cough may be the cause of the cough, the paroxysms of which are more frequent at night.

A cough in the morning only is very suggestive of bronchial or laryngeal catarrh due to change in the temperature or a slight accumulation of secretion during sleep. A man jumps out of bed when warm, and begins to cough because the temperature of the room, unlike the temperature of the bed, is not the temperature of his body. A cough after meals suggests dyspepsia as the cause. A cough on smoking or talking is almost certainly due to laryngeal affections.

A cough only on exertion primarily suggests cardiac debility, but it must not be forgotten that exertion may lead to mouth breathing, with consequent cough. If one begins to put forth great exertion, one usually opens one's mouth and takes a deep breath, and thus irritates the larynx; so that it does not necessarily follow that the cough thus induced by exertion is a cardiac cough. The heart must, of course, be carefully examined, particularly to see if there is any undue frequency or irregularity of rhythm or beat, or if there is an insufficient difference between the first and second sound. *Bruits* are a point of difficulty, because many hearts with *bruits* are working perfectly well; so that a *bruit* alone is of small consequence if the rhythm be not interfered with. If the heart be sound, then a cough on exertion probably means emphysema or chronic irritability of the larynx.

Do you bring up anything with the cough, and, if so, what? Is the cough relieved by bringing up something?—You may derive a great deal of useful information from the answer to these questions. Take a typical example or two. The sputum from a cavity of any sort (phthisical or simple bronchiectasis) is commonly profuse in quantity with each act of coughing, or, rather, with each attack of cough, and the relief experienced is frequently quite complete for a time. The patient has emptied his cavity, has ceased coughing, and then goes on for several hours without any cough at all. The smell of the sputum will largely differentiate between the two conditions, simple phthisis and bronchiectasis. Phthisical sputum very rarely has any smell except a peculiar faint, sickly smell of its own. We all know how offensive a smell a bronchiectatic cavity may have. Again, the sputum of tubercle is nummulated, whereas that of bronchiectasis and other cavities is more homogeneous and watery as a rule.

The sputum of acute affections is thick and very viscid.

What do you bring up?—If he replies to the effect that "It is very sticky," you know that the man has got some acute trouble in connexion with the mucous membrane, for it is only under such a condition that you get very sticky sputum. "Does that give you any relief?" "No, I want to cough again the next few minutes." "Do you bring up any blood?" "No, I have never seen any." This negative reply does not help much. If he says, "Yes, I do bring up blood," one must admit that such a positive reply makes one suspect tubercle, but the affection is not necessarily tubercle all the same, for acute bronchitis and pharyngeal affections are often associated with streaks or stains of blood; hæmorrhage from tubercle is generally free. You will then be careful to examine the back of his pharynx and his teeth to see whether the blood may not have come from the gums or posterior pharynx; if these are healthy you will have to be careful in examining the apices of the lungs, because of the possibility of the complaint being phthisis. But generally speaking the blood spat up from a tubercle is a little clot, whereas in other conditions it is a streak of blood in the sputum. If you see the sputum that is brought up perhaps you will find it to contain a lot of pus. That does not signify very much, except by its quantity. Remember that a mucous membrane very easily produces pus; it is the natural result of inflammation of a mucous membrane. On the other hand, serous membranes when inflamed secrete a clear serum. Purulent inflammation of a mucous membrane may not be anything of great consequence, but purulent inflammation of a serous membrane is a very serious matter.

If there be no sputum we do not get so much information, for a dry cough is met with in so many different conditions. For example, the cough of early phthisis, the cough of heart failure, frequently the cough of all forms of pressure on the trachea, stomach cough, ear cough, and the cough of simple irritability of the larynx are all dry.

Is there pain with the cough?—What is the locality of the

pain if the patient complains of it. In laryngeal and pharyngeal troubles the patient correctly locates the trouble by the associated pain in most cases, though we must not make the mistake of assuming that no local pain in those organs necessarily excludes them as causes of the cough. In pleuritic troubles the patient again will locate the pain in the ribs or just under them. Aneurysm and growths are almost as often free from pain as associated with it. There is one form of pain that must be here alluded to as it is frequently a source of fallacy. In the act of coughing the recti abdominis are given very severe work to do, and the patient will often enough say "There is something the matter with my belly; that is where my pain is." But that pain probably comes from his coughing, and you will find it is so in a large number of cases by examining the abdomen and finding nothing.

Has the voice altered since the cough appeared?—Ordinary laryngeal troubles, with acute or even chronic inflammation, are often accompanied by hoarseness. But the voice may alter in another direction; there may be feebleness of the voice, inability to sustain it, the patient cannot speak a long sentence without getting short of breath. That should put you on the track of the possibility of paralysis of one vocal cord, because the voice is produced by varying degrees of approximation of the vocal cords. If one of the cords is paralysed it will not approach the other, and then there will be an opening left through which the air escapes too rapidly, with the result that the patient will be short of breath, and the voice is not good.

These are, I am afraid, very scanty hints as to the possibility of diagnosing the cause of a cough. At the same time, when you have finished all these questions that I have suggested, it is more than probable that you will have eliminated most of the causes, and not only so, but you will probably have determined positively to what the cough is due.

TREATMENT OF COUGH.

It is a mere truism to say that the first point in treating a cough is to remove the cause if it can be found; it is here that a simple division of coughs into the useful with sputum, and the useless without expectoration is so helpful, for it may be impossible to discover the cause and we may then treat the symptom on first principles, namely, that a dry cough should be suppressed, if possible, and a cough with sputum should be encouraged.

Causes themselves may be divided into the removable and the irremovable, of the former, smoking, talking, exertion are external causes avoidable if not removable, cerumen in the ear, papillomata of the vocal cords, an enlarged tonsil, adenoids, are internal causes capable of mechanical removal, the treatment of both classes is obvious and need not be further mentioned; but the other causes which cannot be thus summarily avoided or removed require careful consideration. I cannot of course enter into a full discussion of the treatment of the diseases which give rise to cough so shall only attempt to lay before you a few hints which I have found very useful. First, the treatment of local conditions within reach of a brush or spray; the actual topical application of drugs to the interior of the larynx (lactic acid for instance in tuberculous ulceration) is rather too special a method for me to touch upon. For relaxed uvula and congestion of the posterior pharynx I have found nothing so useful as the Krameria lozenge of the *British Pharmacopoeia* combined with $\frac{1}{2}$ gr. of cocaine in each lozenge, and this more particularly the case when the trouble is a little farther back behind the anterior pillars of the fauces.

For nearly everything except actual trouble in the mouth itself, I believe that gargles are practically useless; all a gargle does is to moisten the parts in front of the anterior pillars; unless indeed a patient be as skilled as some German ones are said to be who can allow a student to watch water touch their vocal cords; with a patient like these there may be some use in a gargle, but not for the ordinary patient. The above lozenge and others must take the place of gargles unless you have time and opportunity to apply drugs with a brush to the posterior pharynx and top of the epiglottis. I have found that a 1 in 60 lotion of carbolic acid thus applied is extremely useful in what is termed relaxed throat, and in conditions of acute or sub-acute inflammation of the posterior pharynx it relieves pain and checks the cough.

In the use of a spray apparatus my experience is that an indiarubber reservoir between the pump ball and the bottle is very necessary. If only the pump ball is used the spray lasts for just the moment of time during which pressure is being exerted, it ceases directly the pressure ceases. The

right way to use such an apparatus is for the patient to open the mouth wide, place the spray nozzle just within the lips, and then take several deep inspirations while the spray is still actively issuing forth; to enable him to do this it is necessary that the spray should issue for several seconds, and this can only be the case when the elastic reservoir is inserted in the pumping tube. An exceedingly useful mixture to place in such an apparatus is one composed of tinct. benzoin co. vinum ipecac. and a 5 per cent. solution of cocaine, in equal parts; used properly in spray this relieves the cough produced by all irritable conditions of the larynx such as acute and chronic laryngitis, even when tuberculous, and is very useful when nothing is to be seen and yet the patient complains of a tickling in the throat.

I have already drawn your attention to an important principle in the treatment of the useless form of cough in phthisis, namely, to avoid sudden changes of temperature in the air which is breathed or which comes in contact with the skin; a fire in the bedroom and a warm bed for the purpose need not be further alluded to. If, however, the cough, even in advanced cases of phthisis, be useful in clearing out a cavity or emptying tubes filled with muco-purulent secretion, such precautions need not be adopted, at any rate, so vigorously. In definite phthisis with a useful cough I have found nothing so efficacious as the following: Pot. iod., gr. viij; syr. tolu., ʒss; aq. ad ʒss, t.d.s.

In chronic and subacute bronchitis I have a little personal experience to offer you, which is that this is the condition *par excellence* in which smoking and excessive talking should be avoided; but, on the other hand, do not avoid or countermand the cold morning tub—during the night a good deal of secretion collects in the bronchi, and there is no better stimulant to help a cough to clear this out than that derived from the cold morning bath, personally I find it better than any drug. Of course, such a thing is only advisable for those who are accustomed to it; it would not do for those with weak heart or who are unaccustomed to it, and equally, of course, it will not do for bad acute bronchitis. If in such chronic cases cough is very troublesome I find the iodide prescription very useful and also the troch. glycer. et anisi of the Brompton Pharmacopoeia, which loosens the phlegm in a remarkable manner.

I am inclined to think that potassium iodide is much more useful for adults than for children in assisting cough. In the latter I find that belladonna pushed rather freely gives me better results than any other drug; by "pushed" I mean 5 or 6 minims for a child of 2 years, and that given four-hourly; such doses must be watched for dilatation of the pupil and for delirium.

Beyond these few—I fear very fragmentary hints—I have no special panacea for coughs to offer you unless it be that actual change of air—atmosphere—is a very excellent prescription for the cough of debility in those who can afford it.

COMMON CAUSES OF ERROR IN EXAMINATION OF THE CHEST.

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It is unfortunately true that even the youngest and most inexperienced amongst us may occasionally be mistaken. But, even mature experience does not preclude the possibility of error, especially in the solution of problems involving the accumulation of evidence only to be obtained by skilled observation and deductions from signs which are capable of various interpretations. There is, perhaps, no form of medical examination in which constant practice is more necessary in order to detect signs and experience to interpret them than the examination of the chest. This is little realized by the student who has been taught his physical signs from well-marked cases of disease, and it is sometimes lost sight of by the practitioner. Most of us who have been connected with a hospital for chest diseases have watched with amusement the "cocksureness" of the new resident or student, and waited for the "humble mindedness" which comes after a few weeks of special experience. But though we cannot hope entirely to avoid error, we may minimize the chance of mistakes by studying the more common causes of error. I propose to mention some of these under the following headings:—(1) incomplete examination, including want of method; and (2) faulty interpretation of signs, and I shall confine

myself entirely to such cases as have come under my own observation. I need not discuss the mistakes which arise from a routine treatment of symptoms without any attempt to investigate their cause, though this subject might be of value if we could speak to the prescribing chemist. We are justified here in excluding the possibility of carelessness or of ignorance.

In view of the short time at my disposal I shall aim at making my remarks suggestive rather than exhaustive. Let us, then, first consider

ERRORS ARISING FROM INCOMPLETE EXAMINATION.

Although not strictly within the limits defined by my title, I may remind you that it is a serious mistake to neglect altogether to examine the chest when there are conditions which suggest the possibility of mischief within the thorax. I do not, of course, propose that the chest should be examined in all cases which present themselves for treatment, for I know that in general practice this is impossible as well as undesirable. Where, however, there is any ground for suspecting disease of the heart or lungs, examination should not be deferred for the symptoms to develop. We all know, for example, how insidiously tuberculosis of the lung may commence, and how much depends upon early treatment and consequently upon early recognition of the disease. When the family history, general condition, or personal surroundings of a patient point to special predisposition to consumption, a precautionary periodical examination of the chest—say once in six months—is desirable, especially for the few years just before and after puberty.

More definitely within the scope of my subject come those cases in which a partial examination of the chest is made to verify the existence of some conditions suggested by the symptoms for which the patient seeks relief, which being found, no further investigation is pursued. As an example of this, I may instance the cases in which the existence of anaemia has been verified by hearing haemic murmurs in the neck or over the heart, but where no examination of the lungs has been made and commencing tuberculosis has thus escaped detection. I have met with several such cases, in some of which the consequent delay in commencing special treatment has been disastrous to the patient.

Another somewhat similar source of error occurs from neglecting to carry out the examination further as soon as any evidence of lung mischief has been found in one part. In this way pleurisy at one base has been discovered, and tuberculosis at the apex of the same or the opposite lung has been undetected; pneumonia has been correctly diagnosed and pericarditis or endocarditis overlooked; a hydatid cyst in the lower lobe of the lung has been unsuspected, whilst some dullness at the apex was discovered. So also bronchiectasis or tuberculosis may be overlooked when associated with chronic bronchitis or with fibroid disease of the lung.

A curious example of what obvious conditions may be missed by incomplete examination came under my notice a few years ago. A patient was sent to me because of commencing tuberculosis in one apex, and immediately the chest was fully uncovered it was evident that the heart's impulse was on the right side of the chest. Further investigation disclosed complete transposition of the viscera, unnoticed by a man whose skill in physical examination was sufficiently developed to enable him to detect slight changes in the apex of the lung. Examination without removal of the clothing will frequently lead to error. To listen through clothing cannot furnish exact results, and even to leave the clothing over the neighbouring parts whilst the part being examined is bared may cause mistakes. I have been asked to explain the significance of a creaking *râle* which disappeared completely on removing the patient's leather braces.

A not uncommon form of incomplete examination is that due to want of method. If you commence to examine the lung by putting your stethoscope to the chest and asking the patient to take a deep breath, you may at once obtain evidence of disease; but if the examination begins and ends with this you will obtain very incomplete information, and may miss much that is of importance. If on the other hand you develop the habit of systematic and methodical examination, the various stages of investigation—inspection, palpation, percussion, and auscultation—will follow each other as a matter of course in every case, and mistakes will be fewer. The stage which is perhaps most often neglected is that of inspection, yet there is much that is valuable which may be learned from this mode of investigation. I had, only a day or two ago, a very instructive instance of the value of