one of which I should like to see an obstetrician attached for the purpose.

Here again it is a matter of educating the public. That it is worth while attempting is shown by the numbers of women who fill our gynaecological wards suffering from distressing conditions resulting from obstetrical injuries. Had they been recognized at the time they could easily have been rectified. Neglected as so many of them are, they necessitate severe and often hazardous operations.

These phases in the development of obstetrics come at a time when in this country a great part of midwifery practice is in danger of passing out of the hands of the medical profession into the hands of certified midwives, and it looks as if the great fight which our predecessors made to give to the women of Scotland the benefit of skilled attention from properly trained doctors were to be in vain. It must be remembered that England was much behind Scotland in this regard, and it almost looks as if we, as the result of legislation common to both countries passed in the last few years, were making a retrograde step. I grant that the training these midwives receive and the work which they do is good, but very often that training is received at the expense of that of the medical student, and the work of the midwives, especially in this all-important branch of ante-natal care, is limited by their having no general medical education.

If we in Britain are to keep abreast of what our cousins overseas are doing we must be prepared to give a much more thorough and intensive training in midwifery to our medical students. Such training cannot be given by making the attendance on a certain number of cases at the patient's home the chief feature. Clinical medicine and clinical surgery could never be taught in that way, and clinical obstetrics certainly cannot. Clinical medicine and clinical surgery cannot be taught by a few isolated clinics given at intervals throughout the session; neither can clinical obstetrics. What is necessary is intensive training. A certain part of the medical course must be set apart for clinical obstetrics and gynaecology, so that the student may concentrate upon them—live, as it were, in the atmosphere of them. During that time he ought to see all the work of the maternity hospital, the ante-natal clinic, the technique in the labour room, the care of the newly born child, the after-care of the mother, and the post-natal clinic.

I have already had experience of this system of intensive clinical training, which I inaugurated in Toronto eight years ago, and I can speak for its efficiency. The objection that the intensive system leads to too rapid presentation of the subject for its thorough assimilation is got over by a continuation of regular clinical lectures to the whole class, say once a week, throughout the last year of the medical course. That also was a feature of our teaching in Toronto.

With such a system it is possible to make the maximum use of all the clinical material available, which under other conditions is largely wasted so far as teaching is concerned. I hope that it may be possible, with the co-operation of my colleagues in my own and in the other clinical subjects, to inaugurate some such system here in the near future. It is simply a matter of arranging the time-table, for I know that they are in accord with me as regards the principle and had arrived at the same conclusions some time ago. The clinical material is here in Edinburgh if we can only use it, and I hope the time may not be far distant when it will be unnecessary for any of you to seek your clinical instruction in midwifery elsewhere.

The Royal Maternity Hospital and the university now work in the closest co-operation for the treatment of the patient and the training of the student. One of the urgent needs at the present time is the enlarging of that hospital and the adapting of it to modern requirements. Our hospital ought to be a place where the future practitioners of midwifery can see obstetrical work conducted in a manner as near the ideal as human effort can make it. It ought to be fitted up to provide all the things which I have mentioned—the ante-natal clinic, ante-natal beds, and with operating and labour rooms, where perfect aseptic midwifery can be carried out.

There is no more urgent need at the present time than funds for the carrying out of this extension and enlargement of the Royal Maternity Hospital of Edinburgh. Until we get it we cannot do all that we ought to for the training of our future practitioners. We cannot be anything but embarrassed when we have to show to our colleagues from distant lands, who visit this city and university so famous in the history of midwifery, a hospital which, though erected

to the memory of Sir James Young Simpson, is many years behind the times.

I can conceive of no more fitting memorial to the fallen, none which would do more to compensate for the enormous loss of Scottish life in the late war, than the erection and equipment of a modern maternity hospital in Edinburgh.

Some Observations

ON

THE BACTERIOLOGY AND VACCINE TREATMENT OF CHRONIC BRONCHITIS;

BASED ON 300 CASES, WITH SPECIAL REFERENCE TO ASSOCIATED NASAL INFECTIONS.

BY

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THE description "chronic bronchitis" does not convey quite accurately the condition which forms the subject of this paper, for the cases with which it deals fall into three groups which differ both in their severity and in their response to treatment.

1. Those who suffer from frequently recurring attacks of bronchitis but have an interval of several weeks' freedom between each attack.

2. Those who suffer from bronchitis throughout the cold months and are liable to acute exacerbations, but are comparatively free from cough or expectoration during the warmer months.

3. Those who are never free from bronchitis, but are worse during the winter, and are liable to acute exacerbations at any time.

All are liable at some stage to develop asthma as a complication of the bronchitis.

Nearly all such patients find our climate a great handicap, and they would benefit by residence in a warmer and drier land, but very few can afford such a change even during the winter months. It is no secret that ordinary medicinal treatment is disappointing, both to such patients and to their doctors; as time goes on the bronchitis gets worse, and eventually changes in the bronchial tubes, lungs, and heart render the patients incurable invalids.

In the hope of bringing relief to such sufferers I wish to point out a way in which treatment by autogenous vaccines can be made more successful than it has been hitherto. It has generally been taken for granted that in such cases the autogenous vaccine must be prepared from the sputum, and sometimes this can be done with great success. But the practitioner knows little of the technical difficulties which the bacteriologist encounters in attempting to secure pure cultures of the causal organisms in a particular case. It may be easy enough to see the germs but impossible to grow what is seen. The particular sample of sputum may not contain the germs responsible for the catarrh, or may contain one variety only out of several which are responsible. In the most favourable circumstances it is rarely possible to obtain primary cultures in sufficient purity and quantity to make a vaccine, yet most of us feel that there is a virtue in primary cultures that is lacking in the succeeding generations of subcultures.

Then there are the difficulties we make for ourselves. The bacteriologist may not see the patient for whom he is working, he may not even hear the result of the treatment by the vaccines which he has prepared, and so has little opportunity of learning that some of the catarrhal germs are of fundamental importance and others of no account. Better to refuse to make a vaccine than to prepare one from germs which have no pathogenicity.

The impression still seems to obtain that a pot of sputum sent through the post, perhaps twenty-four hours old by the time it reaches the bacteriologist, is suitable material from which to prepare a vaccine. Such a sample is quite suitable to examine for tubercle bacilli, but certainly not for making cultures from which to prepare a vaccine. Such a sample is dangerous because it is fallacious—some of its germs have increased in numbers, other varieties have died. From such a specimen one may prepare an excellent vaccine, but it is largely a matter of chance.

When we also consider the possibilities of error in bacteriological technique, in deciding which germs to include in the

vaccine and which to omit, in adjusting the strength of the vaccine to the age, weight, and condition of the patient, we ought not to be surprised that a considerable proportion of cases so treated fail to make a successful response. Yet I become more and more convinced that if the vaccine is made of the right stuff no case of catarrhal bronchitis will fail to get some relief from it.

Whenever there is sputum to be had it should be carefully examined, but first it must be carefully collected. The patient should be instructed to wash his mouth and throat thoroughly with warm water on waking in the morning, and when next he coughs to expectorate into a short, wide, sterilized glass tube, which is then securely corked. If this first phlegm is partly greenish or yellow there is no need for the patient to collect any more; but if it is simply clear mucus he should try again, for a little purulent material is of great value. This sample of sputum should be sent at once to the laboratory by a messenger who will carry it next to his body or in his trousers pocket, and so keep it warm. Never more than three or four hours should elapse between the coughing of the phlegm and the preparation of cultures; this is so important that it is well worth while hiring a car to save time if a considerable distance separates the patient from the bacteriologist. Such a sample should be examined microscopically; particles should be chosen and cultured on blood-agar, and if the bacteriologist, guided by the microscopic appearance of the sputum and by the clinical symptoms, grows germs which seem adequate to account for the bronchitis, he can hopefully continue his preparation of a vaccine. If, on the other hand, he is not satisfied he should try again with another specimen of sputum. Every sputum is worth examining for tubercle bacilli, for occasionally they are found when least suspected.

Opinions may differ as to the relative importance of the germs found in the sputum in chronic bronchitis, and I will speak only from my own experience. In 130 cases I found germs in the sputum which seemed to me of sufficient importance to be incorporated in a vaccine, though not in all those cases was I content to rely on the sputum alone. The germs so used and the number of cases in which the various organisms were found were as follows:

Pneumococcus	...	...	53=40.0 per cent.
M. catarrhalis	...	...	42=32.5 "
B. influenzae	...	...	58=44.0 "
Friedländer's bacillus	...	...	10= 8.0 "
Streptococcus mucosus	...	...	8= 6.0 "
Other streptococci	...	...	28=21.0 "
Staphylococcus aureus	...	...	1= 0.8 "

It will be seen from the numbers that in about half the cases the infection was a mixed one. The list gives a fair idea of the sort of infections encountered in these cases.

Streptococci (apart from *S. mucosus*) are nearly always present in sputum, and are usually of no account; but they are sometimes of real importance, especially when oral or tonsillar sepsis has been a factor in establishing the bronchitis.

The striking successes occur mainly with pneumococcus, influenza bacillus, Friedländer's bacillus, and *S. mucosus*. The *M. catarrhalis* appears in several forms, of which the commonest seem to play an unimportant part in the causation of bronchitis, but the type which grows in soft colonies and is haemophilic is always worth using in a vaccine. I am quite sure that the bacteriologist who does not grow pneumococci and influenza bacilli in a good proportion of his cases of bronchitis is guilty of some technical fault and will not get really good results from his vaccines.

The diphtheroid bacilli (*B. septus*, etc.) are frequently present, but I have never been convinced that they are of importance, and therefore do not use them as vaccines. There are several types of Gram-positive diplococci or diplostreptococci which are as common in the sputum as in the saliva, and might be mistaken for pneumococci under the microscope, but in culture they can deceive only the inexperienced. I know nothing about filter passers and ultramicroscopic germs, and can only hope that if the day comes when they are proved to be the real cause of respiratory infections it will also be proved that they find their way into our vaccines along with the germs we now consider important.

There is no need to say more about the preparation of autogenous vaccines from sputum. Its success depends largely on obtaining a fresh warm sample, free from contaminations with mouth organisms and food. In favourable circumstances it may still be necessary to test several specimens from the same patient before one gets satisfactory

cultures. There are occasions, however, on which it is impossible to obtain a suitable specimen of sputum—for example, in:

1. Small children who cannot be taught to expectorate.
2. Adults who have just recovered from "another bad attack" and wish to avoid further attacks, but have no sputum.
3. Patients who have all the signs and symptoms of bronchitis except that they cough up no sputum or only a little clear mucus devoid of useful bacteria.
4. Patients who as the result of bronchitis are left with a most irritating dry cough.
5. Patients who have developed asthma as a direct sequel to repeated attacks of bronchitis.

It was in trying to deal with a case of severe chronic bronchitis in a little girl that I discovered a test which has since proved of the greatest help in nearly all subsequent cases. Finding it impossible to obtain any sputum, I took cultures from her nasal passages, and obtained such a pure and profuse growth of pneumococcus that I was able to prepare a vaccine from the primary cultures. Her doctor carried out the inoculations and reported rapid and complete recovery.

After that I tested the nasal passages in every case, and soon discovered that there is a definite connexion between the infection of the nasal passages and the liability to bronchitis. From an experience of 300 cases of bronchitis dealt with during the past eight years I can state that:

1. In many cases the nose and sputum show exactly the same infection, but the nasal cultures, being purer and more profuse, are usually more suitable for the preparation of vaccines.
2. In other cases the nose and sputum show different infections, yet both are important—for example, the nose shows pneumococcus, the sputum influenza bacillus.
3. In other cases the nose shows a useful infection, while the sputum shows none.
4. During free intervals the patient frequently carries in his nasal passages the infection which causes his bronchitis.
5. In most cases in which there is no sputum a convincing culture can be obtained from the nasal passages.
6. Vaccine treatment becomes much more successful when cultures from the nasal passages are used, combined, when necessary, with those from the sputum.
7. There is bacteriological and clinical evidence that bronchitis is not a primary disease but an extension or result of a nasal infection. As a rule such patients do not complain of nasal catarrh, though it is not unusual to see muco-pus coming from the back of the nose into the pharynx.

The following are some of the nasal findings from cases of bronchitis. To those who believe that normal healthy nasal passages abound in pathogenic germs these findings will make no appeal. In my own experience profuse cultures of the chief catarrhal germs are rarely obtainable from healthy persons, and I beg that clinical bacteriologists will give the nasal test a fair trial before condemning it.

The nose was tested in 276 cases of bronchitis and was negative in 20. The 256 positive cases showed:

Pneumococcus	...	...	...	in 118
M. catarrhalis	...	...	...	" 82
B. influenzae	...	...	...	" 49
Friedländer's bacillus	...	...	...	" 38
<i>S. mucosus</i>	...	...	...	" 20
Streptococcus	...	...	...	" 29
Staphylococcus aureus	...	...	...	" 15
Staphylococcus albus	...	...	...	" 7

In no fewer than 173 cases the vaccine was made from the nose alone, either because the sputum was negative or because there was none to be had. The bacteria found and so used were:

Pneumococcus	...	...	...	in 73
M. catarrhalis	...	...	...	" 60
B. influenzae	...	...	...	" 30
Friedländer's bacillus	...	...	...	" 22
<i>S. mucosus</i>	...	...	...	" 14
Streptococcus	...	...	...	" 18
Staphylococcus aureus	...	...	...	" 11
Staphylococcus albus	...	...	...	" 7

Note the similarity between this list and that of the germs found in the sputum of 130 cases.

On the whole these vaccines were so successful that I am forced to the conclusion that the cause of bronchitis, and also of some types of asthma, is to be traced to an infected state of some part of the nasal passages.

The method which I use for testing the nasal passages is very simple:

1. Plates of blood-agar are prepared and warmed in the incubator.
2. The patient sits with head upright facing the light.
3. A tiny sterile swab of cotton-wool mounted on thin wire is gently introduced into one nasal passage, passed horizontally

backwards until it reaches the posterior wall of the nasopharynx, and withdrawn after being left there for a few seconds. The other side is swabbed in the same way.

4. Without the slightest delay each swab is carefully rubbed on a warm blood-agar plate, which is placed in the incubator.

Let it be made perfectly clear that this test can only be performed with the patient near the incubator; if it is not done in this way it ceases to be the test on which this paper is based.

It happens sometimes that the patient is not well enough to come to the laboratory, and in that case the incubator and media must go to the patient. For this purpose Messrs. Chas. Hearson and Co., Ltd., of Regent Street, London, have made me a little warm box just large enough to hold a few Petri dishes. Its water-jacket can be filled with warm water at the patient's house and will remain at about body temperature for several hours, long enough to get the cultures safely to the laboratory.

Bacteria such as pneumococci and influenza bacilli will usually live for some hours in warm sputum, but they are likely to die on a tiny swab even if it is kept warm; hence the advisability of making cultures immediately. Such cultures often show such a profuse growth of pneumococcus, influenza bacillus, Friedländer's bacillus, or *S. mucosus* that a vaccine can be made immediately; but if in small numbers any of the above germs are worth subculturing and using.

Diphtheroid bacilli are very common in the nose; rightly or wrongly, I have never attached any importance to them nor used them in a vaccine. I have also ignored small growths of *M. catarrhalis*, streptococci, and staphylococci, but profuse pure growths are of some importance and should be used.

It is instructive to compare the result of cultural examination of the sputum with that of the nasal passages in 128 cases in which both examinations were made.

Table showing Percentage of Various Organisms found on Cultural Examination of Sputum and the Nasal Passages of 128 Cases.

	In the Sputum.	In the Nose.
Pneumococcus ...	30.0	47.0
M. catarrhalis ...	27.3	23.5
B. influenzae ...	34.0	20.0
Friedländer's bacillus ...	7.0	15.0
S. mucosus ...	4.7	6.25
Streptococcus ...	17.0	10.0
Staphylococcus aureus ...	1.0	4.0

Surely these findings show an extraordinary similarity between the bacteriological state of the bronchi and the nose; one is forced to one of three conclusions—either that these catarrhal germs have nothing to do with bronchitis (in which case we must explain the good effects of vaccines by assuming the presence therein of something more than the known catarrhal germs), or that the nasal passages are infected from the bronchial tubes, or the bronchial tubes from the nasal passages.

I do not hesitate to believe that the last explanation is the correct one, seeing that it is an everyday occurrence for a cold in the head to spread to the chest, that nasal cultures are purer and more profuse than those from the sputum, and that the nasal infection persists during the intervals of freedom from any signs of bronchial infection.

All the patients upon whose cases this paper is founded have been sent to me by their doctors, who have given the inoculations and reported their effect.

I have not made vaccines for patients when I found the bronchitis to be associated with advanced renal and cardiac disease, tuberculosis, or mediastinal tumours. Examples of bronchiectasis are not included in this paper.

The aim of the treatment is to cure those who suffer from frequent attacks but are free during the intervals, to relieve cough and asthma and reduce expectoration in those cases in which a cure is obviously impossible, and to improve the general health and reduce the liability to and severity of acute exacerbations in all.

The vaccines are sterilized by heat, their strength estimated chiefly by the amount of culture used and checked by a count of a stained film. Fifteen doses are prepared and given at intervals of a week, starting with a small dose but increasing steadily as long as the patient gets no unpleasant reaction. Such a course appears to confer a definite immunity lasting a year or more in the case of those who continue to be carriers, and for an indefinite period in the case of those who cease to be infected.

A vaccine does not succeed because it rids the patient of his germs, but because it renders him unassailable for a

certain period; during this time his symptoms may clear up completely though he may continue to harbour his germs in undiminished numbers.

Conclusions.

Recurrent and chronic bronchitis can be cured or relieved by treatment with autogenous vaccines.

When sputum is available it should be sent immediately by messenger to the bacteriologist, and not allowed to get cold.

From such a sample it may be possible to make a good vaccine.

Patients suffering from bronchitis usually have an infection of the nasal passages, which is largely responsible for the bronchitis.

Cultures made from these nasal passages according to the method described in this paper show the same sort of germs as are found in the sputum and make better vaccines.

Nasal cultures should be made in every case of bronchitis in which a vaccine is required, and cultures should be made from the sputum also when it is obtainable; in this way one gets a true picture of the underlying bacterial infections and can prepare a more efficient vaccine than if sputum alone is used.

When no sputum is obtainable a successful vaccine may be made from the nasal cultures alone.

Vaccines do not effect a permanent cure, except in those who cease to carry their nasal infection. But in carriers they confer a useful period of immunity.

It is probable that in many instances a rhinologist could throw light on the real nature of these associated nasal infections and suggest some useful local treatment. In the majority of cases the persons so infected are not conscious of any nasal catarrh, though a post-nasal discharge is often obvious to the physician.

The 300 cases upon which this paper is built were just ordinary private patients sent by their doctor to consult me, there was no preconceived plan or idea in the investigations, which extend over eight years, and any merit these observations possess is due entirely to the painstaking work of my two bacteriological assistants.

SURGERY ON THE HIGH SEAS.

BY

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AND

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The following is a short account of an operation performed on board ship.

The patient, a pantryman of the ship's crew, an old and seedy-looking man of 70, reported sick with retention of urine. At the age of 25 he had contracted gonorrhoea, and showed a healed chancre on the glans penis. For nine months previously he had been troubled with frequent and difficult micturition. There had never been any pain or haematuria, but for the last three months there had been constant dribbling.

He was pale, anaemic, and very wasted. His vessels were very thick and atheromatous, the liver was small, the superficial abdominal veins dilated, and the tongue was furred and dry; he complained of headache. There was no tenderness over the kidneys, but the bladder reached up to his umbilicus. The urine was pale, specific gravity 1004, acid; it contained no blood, but showed a slight haze of albumin, and had a somewhat fishy odour, suggestive of *B. coli* infection of the urinary tract. For three days previously he had vomited at night. On rectal examination the prostate was found to be irregular and definitely enlarged, more so on the right side. It was hard but not fixed.

For ten days his condition was relieved by the passage of a silver prostatic catheter. There was always difficulty in passing the instrument through the membranous and prostatic portions of the urethra. It would stick and then suddenly plunge into the bladder with a corkscrew-like action, but no sense of grating was ever detected. Finally one morning it was impossible to pass the catheter, and suprapubic cystostomy was performed.

The operating theatre was a double-bunked sick bay right over the propeller. It was a rough windy day. The stern rolled and pitched vertically up and down, and to this was added a lateral vibratory movement when the propeller came up into surface water. An electric hand torch proved very useful, as the light was cut off by the fixed bunks overhead. The patient being considered too bad for a general anaesthetic, stovaine-billon was successfully injected intrathecally. No rubber tubing being available, a 1½ in. bore hose-piping, sterilized and stitched into the bladder, proved an efficient if not too liberal means of drainage. An improvised Hamilton Irving receiver was made out of an inverted soap dish.