progress was being made, I found, on introducing the finger, that a sinus ran for some distance in a direction upwards. This I dilated, and detected a collection of pus partially shut off from the rest of the pleural cavity, and lying nearly as high as the clavicle. The sinus was dilated, and the empyema subsequently closed. Secondly, Estlander's operation affords a method of dealing successfully with cases hitherto incurable, in which the lung is bound down and the chest wall is prevented, by the rigidity and close apposition of the ribs, from falling in and thus obliterating the cavity. Time does not permit me to enter upon any description of the method by which the extensive removal of ribs that may be called for can best be carried out. A full account will be found in Mr. Godlee's lectures to which I have already referred. I will only say that, though it may not often be required, it is a highly important addition to the operative surgery of the thorax.

CLINICAL REMARKS

ON A

CASE OF BRONCHIECTASIS TREATED BY INCISION AND DRAINAGE.

Read in the Section of Medicine at the Annual Meeting of the British Medical Association, held in Glasgow, August, 1888.

By DAVID W. FINLAY, B.A., M.D., F.R.C.P.,

Physician to the Middlesex Hospital, and to the Royal Hospital for Diseases of the Chest.

INCISION of the lung, whether for acute or chronic diseased conditions, has been so seldom practised that it seems desirable to place on record every case, in order that a sufficient body of experience may be accumulated, which may in the future enable conclusions of some value to be arrived at as to the propriety of this method of treatment, the dangers attending it, and the results to be expected. The best results have followed the operation in cases of abscess of the lung, although some have been recorded in which cavities of bronchiectatic origin were dealt with successfully. It is obvious to remark here, however, that the differentiation of such cases from those of localised empyema must often be very difficult, and it is not improbable that in some of these the latter has been the diseased condition calling for operative treatment.

The patient in the present case was a boy aged 10, who came under my care in the Middlesex Hospital on October 19th, 1886. He had been under hospital treatment from March 4th to April 25th, 1885, when it was noted that there was a family history of phthisis on both father's and mother's side, and that two years previously he had suffered from what had been called congestion of the lungs, followed by chronic cough and occasional night-sweating and diarrhoea. His physical condition then was much as I shall relate it, except that the signs of disease of the right lung were less marked. He did not then expectorate much, although what he did spit up was fetid.

On admission on October 19th his temperature was 100.2 F., pulse 120, respirations 36. He was pale and rather emaciated, complaining of pain in the chest and shortness of breath, especially on exertion, with cough and a copious expectoration of ill-tasting sputum. The last was so disagreeable to him that it frequently led to vomiting, and it was then that the pain was most troublesome. His bowels were regular, and his appetite fair.

On examination, the ends of the fingers and also the toes were seen to be extremely clubbed. There was some flattening of the right side of the chest, with very deficient movement and well-marked retraction on inspiration of the intercostal spaces in the neighbourhood of the inferior angle of the scapula. The percussion resonance was much impaired over the right side, both back and front; the vocal resonance and tactile fremitus were increased. As regards auscultation, the breath sounds in front were cavernous in character above the second and below the fifth rib, being tubular rather in the intermediate region, and they were everywhere accompanied by loud bubbling metallic *râles*. In the anterior axillary region there was marked cavernous breathing, extending from the fourth to the sixth rib, where loud bubbling *râles* were heard, with whispering pectoriloquy. Posteriorly the breath-sounds were tubular over the lung generally, being accompanied

by bronchophony, whispering pectoriloquy, and numerous moist *râles*. The pectoriloquy was most intense over a small area between the inferior angle of the scapula and the spine, where, also, the breath-sounds were markedly cavernous. The left lung, back and front, was resonant, the resonance in front extending across to the right of the sternum; the breath-sounds were exaggerated, and, in the region of the apex of the lower lobe behind, a few fine moist crackles were heard accompanying inspiration.

The heart's maximum impulse was found in the fourth interspace, half an inch internal to the right nipple; the area of cardiac dulness was continuous with that of the right lung, and the sounds were clear. The abdomen was natural, the urine clear, acid, and free from albumen and sugar, and with a specific gravity of 1021.

The breath was extremely fetid, together with the sputa, which were copious, purulent, and non-aerated. A large quantity was brought up at times after severe coughing, and this was often followed by vomiting.

He was ordered a mixture containing quinine and sulphuric acid, and an inhalation consisting of eucalyptus oil, tincture of iodine, compound tincture of benzoin, and spirits of chloroform. He sweated profusely at night; and the expectoration, although diminishing somewhat, still continued copious and insufferably offensive. The quantity, so far as it could be measured for four days preceding the operation about to be described, averaged about nine ounces, but this estimate did not take account of what was lost when vomiting occurred.

From the length of time that the boy's illness had lasted, and the fact that his previously sound lung was evidently becoming affected, his state otherwise also remaining practically unchanged, and the factor of his sputa and breath being a cause of distress to himself and to all around him, it was reasonable to conclude that little prospect of good could be entertained from ordinary methods of treatment. Accordingly, after consultation with some of my colleagues, I decided on giving him the chance of benefit which might result from surgical intervention.

It should be mentioned here that the sputa were examined for lung tissue and tubercle bacilli with negative results. His temperature was hectic in character, but the evening rise was not great until about a week after admission, when it shot up to 102.2° F.

Having decided upon the spot in the posterior chest-wall where the maximum intensity of the signs of cavity indicated the part of lung which it was desirable to incise, my surgical colleague, Mr. Henry Morris, at my request, passed a trocar and cannula into the lung, to the depth of about an inch and a half, the spot of puncture being in the seventh interspace, about half an inch internal to the angle of the scapula. On the withdrawal of the trocar, a jet of fetid pus spurted from the cannula, indicating that a cavity had been tapped. The cannula being kept in its place as a guide to the cavity, an incision was made over the eighth rib, a portion of which, about an inch and a half in length, was removed. As the pleural surface was not found to be adherent round the opening, the lung was stitched to the chest-wall by three sutures. A small bistoury was then passed along the side of the cannula into the cavity and an incision made in the lung, through which a medium-sized india-rubber drainage-tube was passed. From this a little blood-stained pus exuded, but there was no hæmorrhage of any consequence. The wound was then dressed and the boy was put to bed. Being in great pain in the night, he was ordered a small dose of opium frequently repeated, which relieved the pain and enabled him to get some sleep. The operation was performed in the afternoon of October 27th, and for the two succeeding days the boy's temperature was much lower, and the expectoration less in quantity and less fetid. There was still some pain, however, and he was ordered 2-minim doses of tincture of opium to be taken with his mixture of quinine and sulphuric acid every four hours.

On October 30th it was noted that his cough was more troublesome, and the sputa again more copious and more offensive, his pulse being 120 and respirations 40 in the minute. The dressings were removed by Mr. Morris when it was found that the drainage-tube had slipped out, and there was no free discharge from the wound, the dressings, however, being stained with pus, and having a very foul smell. A piece of gum-elastic catheter, No. 8, two inches in length, was inserted in place of the soft drainage-tube after a probe had been passed, and the part irrigated with warm Condy's fluid. The superficial wound was then dusted over with iodoform and the dressings reapplied.

On November 2nd the wound was stated to be looking healthy, and there was a fair amount of discharge on the dressings. A probe introduced into the lung cavity could be moved pretty freely in all directions. On examining now the right chest the upper part was found resonant, but below the level of the wound still dull on percussion. Bubbling *râles* were heard over the upper part in front, also faintly heard behind, and below the wound there were coarse friction sounds. The heart's maximum impulse, which before the operation had been in the neighbourhood of the right nipple, was now in the fifth interspace just to the left of the sternum, where also the first sound was loudest.

On the following day (November 3rd) the stitches were removed. The discharge appeared to be lessening, but it and the boy's breath were still fetid, and he sweated profusely when asleep.

On November 6th, at 1.30 P.M., he was seized with a severe attack of coughing, and brought up a considerable quantity of blood; at the same time it was found that blood was oozing through the dressings, and he was becoming blanched. On removing the dressings a large amount of clot was found on their surface, and the whole thickness was soaked with bloody fluid. Fresh dressings were applied, and the drainage-tube left out. Ten minims of liquid extract of ergot were added to his mixture, and he was ordered a teaspoonful of port wine every two hours.

Next day a good deal of blood-stained discharge was found on the dressings, the wound being plugged with clot. The respirations were 60 per minute, and the sputa less offensive.

From this time onwards he got gradually weaker, but no more bleeding took place. The following note was made on November 10th, the day before his death:—"The patient had a fairly good night, sleeping comfortably at intervals. Little sputum is expectorated but that little is very offensive. He is much emaciated and very peevish. The wound looks fairly healthy, and air passes in and out of the opening in the lung; the discharge on the dressings is moderate in quantity and blood-stained; the tube has not been re-inserted. Only a superficial examination of the chest could be made owing to the patient's weakness. This showed that the physical signs were practically unchanged since last examination. He is very pallid; pulse 150, respiration 62." During the following night he was delirious. His breathing became more rapid, and he died from exhaustion on November 11th at 7 A.M.

At the *post-mortem* examination, which was made by Dr. Fowler, the following condition of affairs was noted. In the right infra-scapular region, three inches and a half from the middle line, a portion of the eighth rib had been removed. The wound *in situ* led into the right lower lobe, and also opened the pleural sac. On removal of the sternum the left lung was seen to be much enlarged, extending an inch and a quarter beyond the middle line in the first and second interspaces. The heart was displaced to the right, lying behind the sternum. On the left side there were no pleural adhesions; on the right adhesions separated the pleural cavity into three distinct sacs. The upper corresponded to the apex, and reached to the second interspace anteriorly, the pleura in the sac being normal. The second corresponded roughly to the area of the middle lobe. The third extended backwards from the line of the interlobar septum, and constituted the sac of an empyema which had been produced as a result of the operation, the pleural layers not being adherent opposite the anterior margin of the wound, allowing irritating material from the incised lung to escape into it and set up inflammation.

The right lung was removed with both layers of the pleura attached; the left lung was also removed with it. On laying open the right lung from behind, the following changes were noted. The lining membrane of the trachea and bronchi was acutely inflamed; and in the main bronchus, extending downwards to the lower lobe, almost in the direct line of the trachea, a small triangular portion of bone was found, firmly embedded in the lining membrane, where it had excavated a small sac. The upper lobe was pale and collapsed, and contained two small gangrenous areas; the bronchi were dilated but not ulcerated. The middle lobe was also collapsed and its bronchi dilated. The bronchi of the lower lobe were dilated throughout, forming tubular cavities, which occupied the greater part of the lobe. These were filled with horribly fetid secretion, and their lining membrane was inflamed and thickened but not ulcerated. The portions of lung intervening between the dilated tubes were in a condition of chronic pneumonia and induration from fibrosis. In the operation a large bronchiectasis had been opened and drained

and a tube inserted. This cavity was found to be filled with blood-clot, pale and indistinctly laminated. On removing this, the cavity was found to communicate by a large opening with sloughy margins with a main branch of the pulmonary artery. This was the source of the hæmorrhage, which had ceased on the ectasia becoming filled with clot and its external opening being closed. (Had the opening through the pleura been made half an inch nearer to the spine, the pleural sac above mentioned would have been missed.) There was a large bronchial gland at the bifurcation of the trachea. The upper lobe of the left lung contained two gangrenous patches; the lower lobe showed numerous areas of catarrhal pneumonia. There was no tubercle found in any organ.

The principal varieties of morbid condition for the relief of which incision of the lung has been practised have been thus summarised: (1) abscess of the lung; (2) gangrene of the lung; (3) bronchiectasis; (4) tubercular cavities; (5) hydatids; (6) foreign bodies.

Cases of abscess, gangrene, and hydatids are perhaps those in which the best results have been obtained, and the amount of success attending such cases has been so great that there need be no hesitation in having recourse to this plan of treatment in regard to them. But with bronchiectasis it has been different. Some cases of bronchiectasis have been undoubtedly benefited, a few have been cured; and with regard to others which have been reported, it may be said that some have been admittedly complicated with localised empyema, and that in the case of others the same complication may be reasonably suspected. In the latter class of cases it is not to be wondered at that cure resulted, inasmuch as the bronchiectatic condition was probably secondary to the empyema; and when the pus was drained by external opening, the bronchial dilatations contracted, and ceased to secrete pus. Of those which have been thought to be genuine cases of uncomplicated bronchiectasis, and in which incision of the lung has been practised, I have found records of twenty-two cases, inclusive of the present, and the results have been the following. Four appear to have been completely cured, three have been relieved or partially cured, and fifteen have died within varying periods after the operation. Of the fatal cases, no fewer than three have died from cerebral abscess.

Of the cases in which complete recovery has resulted, the most recent of which I have been able to find particulars was reported by Professor Grainger Stewart at a meeting of the Medico-Chirurgical Society of Edinburgh in July last year. The patient was a man, aged 27, suffering from cough and profuse expectoration of offensive material following an attack of pleurisy nine years previously. With the exception of the fact that it was the left side which was affected, both physical signs and symptoms very much resembled those present in my case. Free incision and resection of a portion of rib were practised, large india-rubber tubes passed, and the cavity washed out with warm boracic acid lotion. In the recorded particulars it is stated that, about a fortnight after the operation, "three smart hæmorrhages took place from the interior of the cavity, which gave rise to some anxiety, otherwise the progress was satisfactory in the extreme," the fætor disappearing, and the discharge gradually diminishing, with steady progress towards recovery.

This severe hæmorrhage occurring also in my own case, although not usual, has been observed in several of the cases to which I have referred. It was present conspicuously in one reported by Dr. C. T. Williams and Mr. Godlee, in the *Transactions of the Royal Medical and Chirurgical Society* (London), 1886, vol. lxi, p. 318, the patient being a young woman, aged 21, although here the blood did not pass by the external wound, but was coughed up.

There may be various causes for such hæmorrhage, but I am inclined to think that in my case it was due to the pressure of the end of the drainage-tube against the wall of the branch of the pulmonary artery which had given way.

The same conclusion is arrived at by Dr. Williams in regard to the case just referred to, and in another of his cases, where hæmorrhage occurred from the wound, and was apparently due to ulceration from pressure of one of the drainage-tubes. That it had nothing to do directly with the operation is obvious, from the fact that it occurred in the different cases in which it was observed after the lapse of from one to three weeks.

I have said that as to the question of operation in cases of

¹ C. T. Williams, *Proc. Med. Soc.*, vol. iv, 1884, p. 323; C. Y. Biss, *Trans. Med. Chir. Soc.*, vol. lxxvii, 1884, p. 217; R. J. Godlee, *Lancet*, vol. i, 1887.

abscess or gangrenous cavity there is little room for hesitation. But it may be asked, is operation to be commended in the class of cases which I have described? To this I would say that in chronic cases in which no substantial benefit accrues from ordinary methods of treatment, where the copious expectoration must act as a constant drain, and is so insufferably fetid as to poison the patient himself and all around him, I think the operation is justifiable. But when, in addition, there are signs of involvement of the previously sound lung, and the not inconsiderable risk of death from abscess of the brain is kept in view, it becomes a question whether the operation is not only justifiable but necessary. In any case there has always been marked alleviation of some of the most distressing symptoms.

As it happened in my case, although there was nothing in the history of the illness to lead to a suspicion of the presence of a foreign body in the bronchus, the fact that a foreign body was there would have greatly diminished the chances of a favourable result, unless in the event of its finding its way out by the external wound.

I may say as regards etiology, that two other of the twenty-two cases of bronchiectasis I have referred to were due to a similar cause; in one a piece of straw was found, and in the other a tooth which had eluded the dentist in the act of extraction.

As to the surgical method in such cases there is no need to say anything. Nothing can be added to what has been said by Mr. Godlee on the subject in his Brompton Lectures (*Lancet*, vol. i, 1887). It has been recommended that care should be taken, before operating, that the pleural layers are adherent. I think, however, that it will be generally admitted that, however probable the adhesion may be in some cases, its certainty can never be assumed until the incision has been made. In the present case the pleura was adherent, but only to the extent of half the length of the wound. If we had only been fortunate enough to have had the opening made half an inch or so nearer the spine, a completely adherent part would have been incised.

To remedy, so far as possible, the lack of adhesions, the lung was stitched to the chest-wall, but this did not suffice to prevent septic material from getting into the non-adherent part of the pleura and setting up a limited empyema.

THE TREATMENT OF RECENT PLEURITIC EFFUSION BY THE ADMINISTRATION OF SALINE CATHARTICS.

By P. BLAIKIE SMITH, M.D.,

Physician and Lecturer on Clinical Medicine, Aberdeen Royal Infirmary.

THOSE whose general practice it is to treat cases of considerable pleuritic effusion by tapping the pleural cavity must confess that, not infrequently, the fluid reaccumulates, and that it occasionally becomes purulent. Recognising the truth of this clinical observation, I have for some time past discarded operative interference in such cases, relying, for the relief of the effusion, upon the effects produced by saline cathartics, administered in a manner which I shall indicate presently. The exact physiological action of this class of drugs is beyond the scope of the present paper. Suffice it to say that, primarily, they induce watery evacuations from the bowels, with the necessary result that the blood becomes inspissated and absorption stimulated, and hence their well-known utility in the removal of dropsical conditions. Bearing in mind this fact in therapeutics; recollecting, too, that serous exudations have been known to disappear during an attack of cholera (when the blood is to a great extent deprived of its watery element), and that the simple withdrawal of fluids from the diet has been advocated as curative of pleuritic effusion, it seemed reasonable to suppose that if a patient, the subject of this complaint, were starved of fluids and purged by salines, the resulting concentration of the blood would be remedied at the expense of the effusion. In this expectation I was not disappointed, as will be seen from the notes of the following cases treated in accordance with the theory set forth above.

The first case was that of a spare-looking man, aged 28, who was admitted into the Aberdeen Royal Infirmary on January 26th, 1887, suffering from acute pleurisy, with extensive effusion on the left side. The chest gave a dull percussion note up to the second rib, and the heart was beating away to the right of the sternum. The temperature was 101°. For five days after admis-

sion, he was treated by the administration of alkaline diuretics, along with the application of counter-irritants. At the end of that time, however, as there was not the slightest improvement in his condition. I determined to try the effect of saline cathartics. Accordingly, on February 1st, I ordered him to have, twice a day, two drachms of magnesium sulphate, dissolved in as small a quantity of hot water as possible, and directed that he be almost starved of fluids, taking care on this head to explain to the patient the object of this (to him) somewhat extraordinary procedure. In passing, I may mention that magnesium sulphate was the saline chosen, partly from its effective cathartic properties, and partly from its great solubility, for it is dissolved in less than its own weight of hot water. The effect of the treatment was soon apparent, and, without going into the gradual changes that took place in the physical signs, it will be sufficient to state that in eleven days all evidences of effusion had disappeared, and that the heart was restored to its normal position. As was to be expected, the secretion of urine underwent marked diminution during the time the patient was under the cathartic treatment, and it is interesting to note that the amount became more than physiological soon after the drug was discontinued.

The next case was that of a robust-looking fisherman aged 28, who was admitted to the Infirmary on May 19th, 1888, complaining merely of debility. On physical examination of the chest, however, there were signs of great pleuritic effusion on the left side. Skodaic resonance was unusually distinct, and the heart was seen pulsating in the right third interspace. There was no increase of temperature. Without spending time in any preliminary treatment, the patient was ordered on May 22nd to have twice a day half an ounce of magnesium sulphate dissolved in the minimum quantity of water necessary for solution, and, as in the previous case, the ingestion of fluids was restricted. Free purgation rapidly ensued, and on May 24th cardiac pulsation was faintly visible in the left fourth interspace close to the sternal edge, but it was still to be seen, though less distinctly than upon admission, to the right of the sternum. Skodaic resonance was now greatly diminished, and the other signs of effusion were much less evident.

On May 29th it was noted that the apex of the heart was beating vigorously in the left fourth interspace midway between the nipple and the sternum (apparently the normal situation in this patient, for there it subsequently remained); skodaic resonance could no longer be elicited; all signs of effusion had disappeared, and loud pleural friction was audible at the extreme base of the lung posteriorly. Within a week from this date the last traces of friction vanished, and the patient was discharged.

In bringing before the profession the treatment of pleuritic effusion by the administration of saline cathartics, as illustrated by the foregoing cases, I trust that I will not be understood as recommending its indiscriminate adoption. Patients of poor physique or in whom a phthisical tendency exists are obviously ill suited for this plan of treatment, and I need hardly mention that when dyspnoea is an urgent symptom, especially when accompanied by signs of collateral hyperæmia or œdema, the use of the trocar gives more speedy relief than that afforded by free purging. Still, one meets with many cases where the effusion is large and of recent occurrence, where dyspnoea is not pronounced, and where signs of physical and constitutional debility are absent, and these are the cases which seem to me to be peculiarly adapted for treatment by the method which is the subject of this paper.

SUPPURATING HYDATIDS OF LIVER: INCISION AND DRAINAGE: RECOVERY.

By WILLIAM S. PAGET, M.D. LOND., M.R.C.P.
Great Crosby, Liverpool.

THE following case, I think, presents some features of interest at the present time, when the surgery of the liver is attracting considerable attention.

W. P., a young man, aged 18, a grocer, resident in the Isle of Man, began to be unwell about the end of March, complaining of shivering, sickness, feverishness, with pain in the right side; no cough, but considerable dyspnoea. He was seen by a medical man and pronounced to be suffering from indigestion and bilious-