will at once indicate the absorption of poisonous matter; and immediate removal of the cause of the mischief is necessary.

In these cases, where a free vent for the pus is imperative, and where the ill effects of decomposition in the pleura have been manifested, we have had to decide between two evils: the evil of letting the patient alone, and the evil of adopting a mode of treatment that is disturbing and exhausting to him, and a source of irritation, and probably of increased suppuration as regards the pleura itself. As, however, the former evil is by far the greater, we have had to put up with the latter.

The problem is, therefore, set before us: How can we allow free exit to discharges, and, at the same time, prevent decomposition in the pleura? I believe that Professor Lister has found the solution of this problem for us in his antiseptic method.

To return to the case I have brought before you. Within three months more than ten pints of pus had been withdrawn from the chest, and the rapid reaccumulation of fluid, together with the onset of hectic, made it evident that there was no tendency to that speedy cure of empyema that sometimes takes place in children. The drainage-tube was then inserted antiseptically, and the details of the after-treatment were carefully carried out. The discharge, at first profuse, rapidly diminished, and in about two months the boy was practically cured. His general condition had, meanwhile, undergone the most marked improvement. There was no decomposition of the pus throughout.

What amount of disturbance did the treatment entail upon the patient? Simply the removal of the old dressings under the spray, and the substitution of fresh. No pain was given to the patient; and at no time was it necessary to use any injections into the cavity, and there was no evidence of any irritation of the pleura. Thus the physical and moral disturbance of the patient was reduced to a minimum.

Contrast this with the treatment by injections that I have before described, and the result is surely favourable to the antiseptic method.

Again, whilst the injections have to be persevered in once or twice every day, the intervals between the antiseptic dressings gradually lengthen as the discharge decreases; at first, the dressings must be renewed twice a day, soon only once, then every other day, then once in two, three, or four days. The frequent repetition of injections is unavoidable, owing to the *rapidity of decomposition*; whilst the *antiseptic dressing* is renewed only when the *amount of discharge* makes it necessary—decomposition being excluded from consideration.

It appears to me that the antiseptic method is especially applicable to the treatment of empyema; in this disease, the conditions are much the same as in chronic abscess, as, for example, psoas abscess. In both the course of the disease is more or less chronic—in both there is a large suppurating surface, communicating with the external air by a small opening only, and it is specially easy, by the use of antiseptics, to guard this small opening against the entrance of the excitors of putrefaction, whatever they may be; in both, the large extent of internal surface and the small vent for discharges, make the presence of putrid matter proportionally dangerous; and in both will the antiseptic treatment ward off the constitutional disturbance that the absorption of septic matter is well known to produce, and which too often ends in the exhaustion and death of the patient.

There is yet another advantage that I would claim for the treatment I have advocated. We know now that thoracentesis is not the absolutely safe operation that it was once hoped to be. Every now and then we hear of a case where sudden death has occurred, either during or immediately after the operation, or during the after-treatment.

In the first class of cases, where death occurs either during the operation or immediately after it, the fatal result is evidently due, in one way or another, to the removal of the fluid; and against these cases the antiseptic treatment manifestly affords no safeguard.

In the second class, sudden death has taken place during the after-treatment; and, in a large proportion of the reported instances, this has occurred during or immediately after the washing-out of the pleura. We are, therefore, led to seek for an explanation of the causal relationship of the injection to the fatal result. As stated in the BRITISH MEDICAL JOURNAL of February 12th, the probable hypothesis is that the long-continued compression of the lung favours the formation of clots in the pulmonary veins or in the left auricle; and that, during the process of washing-out the pleura, fragments of these may be detached, conveyed into the left ventricle, and thence into the cerebral arteries. Vallin reports a case where this was probably the cause of death, but there was no autopsy. Dr. Balthazar Foster, in the *Medical Times and Gazette* for 1874, relates a remarkable instance that is strong evidence of the truth of this theory; in his case, after thoracentesis, gangrene of both legs set in, together with symptoms of suppression of urine. *Post mortem*, both common iliac arteries were found blocked by embola, and similar obstructions existed in the kidney and spleen. On examination of the heart, a branched clot was found lying loose in the left ventricle,

and the mouths of the pulmonary veins were partially blocked by coagula, one of which hung down into the left auricle. The clots in these pulmonary veins were evidently the source of the embola.

Hence the conclusion: if we avoid injections, we avoid the probable cause of so serious an accident as sudden death during the after-treatment of empyema. By adopting the antiseptic method, we avert the necessity for any disturbance of the pleura by injections.

To sum up: in all cases of empyema, where it is necessary to establish a fistulous opening, I strongly advocate a fair trial of the antiseptic treatment. To the objection, that many patients do well without any use of injections, I reply that, in a given case of empyema, it is impossible to say what will be the course of the disease after the opening is established—whether cure will be effected without any further local treatment, or whether a long course of injections will be needed; and that it is prudent to adopt that method which, while benefiting the simplest cases, will place the most severe under the best conditions for recovery.

The advantages of the antiseptic treatment are these.

1. A free discharge is allowed.
2. Decomposition and consequent absorption of the products of putrefaction are prevented.
3. The treatment is very much less disturbing and exhausting to the patient, both because the process itself is much simpler, and also because it is less frequently repeated.
4. There is no irritation of the pleura.
5. One, and perhaps the chief, cause of sudden death during the after-treatment is avoided.

In a word, by the application of the antiseptic method to empyema, we are enabled to secure all the advantages of a free opening, without any of its disadvantages.

NOTES OF A CASE OF EMPYEMA: THORACENTESIS: ALBUMINOUS EXPECTORATION.*

By DONALD FRASER, M.D., Paisley,
Fellow of the Faculty of Physicians and Surgeons, Glasgow.

THE following case of empyema presents a few points likely to be of interest to the members of this Society. The case was carefully watched throughout its course, and I had the benefit of repeated consultations with Dr. Gairdner.

The patient was a young married lady, living in the country, of active and healthy habits. Her health, prior to this attack, had always been good, though her appearance gave the impression of delicacy. Her family history was upon the whole good. A brother had died a few months before my attendance began, from heart-disease. Rather curiously, also, a married sister, while in attendance upon my patient, had a sharp attack of pleurisy of the left side, with well marked effusion, accompanied with rusty and muco-purulent expectoration. From this illness she made an early and good recovery.

On March 26th, 1875, after exposure to cold, my patient was taken ill with symptoms of a severe feverish attack, which in a few days declared itself as a pleurisy of the left side, which went on to effusion. The temperature in the axilla on the eighth day of the disease was 102.8 deg. Fahr. I need not weary you with the ordinary details as to physical signs and treatment. I may note, however, that a blister, applied, with the approval of Dr. Gairdner, gave rise to a severe strangury, with hæmaturia; the urine for a few days being highly albuminous, and showing abundance of renal epithelium.

On the thirteenth day, the evening temperature fell two degrees. On the fifteenth, a rise again took place, accompanied by rusty expectoration. From this time the fever increased, and maintained the character of hectic pyrexia; the average morning temperature being 100 deg. Fahr., the evening 103 deg. (see chart†); pulse between 120 and 130. An abundant frothy mucous expectoration, occasionally rusty, prevailed up to the thirty-seventh day. The effusion continued steadily to increase, pushing the heart more and more to the right side, till, by the twenty-sixth day, it was beating under the right nipple. There was complete dulness to percussion over all but the apex-region; no respiratory murmur, save in the same region, while in the infraclavicular space there was to be heard a mucous *râle*, with a suspiciously hollow sound. On measurement, the left side was found to be three-quarters of an inch greater in circumference than the right. The right lung remained free from any indications of collateral fluxion. There

* Read before the Glasgow Medico-Chirurgical Society.

† A chart, showing the temperature, pulse, and general course of the case, was handed round in the society.

was dyspnoea, though not to a distressing extent. As the disease progressed, it became a question whether there was not a tubercular element in the case. The continuance and character of the pyrexia, and the whole aspect of the patient, made it very probable that at all events the effusion had become purulent.

At a consultation on the thirty-sixth day of the case with Drs. Gairdner and Begbie, it was decided that paracentesis thoracis should be performed. This was done by Dr. Gairdner with a Bowditch's syringe; the puncture being made about the eighth interspace, and in the perpendicular line of the lower angle of the scapula, this being the usual situation recommended by Bowditch. The first few strokes of the piston brought out about a tablespoonful of healthy purulent fluid. No more could be obtained, and, after the use of as much force as could safely be applied, the cannula was withdrawn. Drs. Gairdner and Begbie recommended that, as soon as the patient had recovered from the effects of this interference, a free opening with antiseptic precautions should be made, and a drainage tube inserted. It was also suggested that she should have large doses of quinine. Two days afterwards (April 27th), I obtained the assistance of Dr. Hector Cameron, who made a free incision antiseptically into the chest-wall, a few inches further out, and in the interspace below that punctured by Dr. Gairdner. The old difficulty, evidently a mass of tough fibrine, was met with, preventing the exit of the pleural fluid. An aspirator-needle was introduced at this stage through the incision in the chest-wall; but we were unable to withdraw more than an ounce of fluid. I agreed with Dr. Cameron, that to pursue the attempt in that situation, and at that time, would be highly inexpedient. This particular locality, though recommended by Bowditch, is evidently not the best place for the puncture, because of the greater likelihood of finding an abundance of false membrane there.

Before another puncture could be made, there occurred a most interesting change in the case. Next day, I found my patient none the worse for the interference, and, on examination of her chest, was rather astonished to find that the area in which the respiratory murmur was audible had perceptibly, though very slightly, increased. I was informed that the expectoration, which throughout had been abundant, and of a frothy mucous character, had increased in quantity during the previous night. I found it to be still of the character already described, with the addition of a large quantity of clear translucent fluid; this fluid had begun to be expectorated a few hours after the puncture. The fluid, on addition of nitric acid, or on boiling, coagulated into an almost solid mass. On filtering, it gave the same reaction. Under the microscope, it showed an abundance of epithelial and pus cells. The second day after the puncture, my patient expectorated about a pint of mucopurulent matter. The albuminous fluid was very much lessened. I may here remark that this albuminous expectoration did not last much longer than this day (April 29th). Coincident with this increased expectoration, the area of respiratory murmur was increasing, there being obvious signs of increased expansion of the upper part of left lung. Dr. Gairdner, who saw her at this time, advised fresh delay as to repeating the paracentesis. April 30th, very little expectoration; pulse 130; respirations 30 per minute. May 1st, pulse 140; much coughing, and dyspnoea; the sputa were distinctly purulent. On percussion, the stomach-note was heard in the left axillary region, about the level of the left nipple. It was now certain that perforation of the lung had taken place, and that the empyema was discharging itself by way of the bronchi.

For the next twenty-one days, that is, from the forty-first till the sixty-second day of the case, she put up an average of a pint a day of purulent matter. After the latter date, the quantity gradually lessened, and ceased entirely on the one hundred and third day. With the view of obtaining even negative evidence of the condition of the lung, I, on one occasion, boiled a pint of expectoration with caustic soda, but was unable, on microscopic examination, to find any specimen of lung-tissue.

From the date of perforation, the temperature fell steadily, though, during the expectoration of the pus in large quantity, the evening temperature remained about 101 deg. Fahr. The temperature did not reach the normal permanently until the one hundred and thirteenth day. The measurement of the two sides was found to be equal on the forty-eighth day. The heart came back very gradually, and did not reach its proper position until the sixty-seventh day. Ten days after the perforation, there were indications in the posterior and middle portions of the left chest of limited pneumothorax, of a temporary character. I would find tympanic percussion over the part in question at one visit, and two days afterwards would find that it had disappeared.

I need only now record that my patient made a most excellent recovery, that she at present feels and looks remarkably well, and has come through some very unpleasant weather. The left lung has recovered to a wonderful extent, being certainly no worse than after many

ordinary cases of pleurisy, with effusion and absorption. The respiratory murmur in the apex-region is quite normal. There is still some dullness on percussion, and feeble respiratory murmur at the base. Three months ago (October 1875), there was a difference of three-quarters of an inch in the circumference of the two sides; this, of course, is due to the contraction of the affected side. It may be of interest to mention that twenty grains of quinine were given every day, for thirty-eight days, with great apparent benefit, and without causing the slightest gastric or other disturbance. She took, in all, 1,150 grains of quinine. On the only occasion on which we intermitted the quinine for a day or two, a rise of about a degree in temperature took place. I am persuaded that the quinine exercised, at the least, a slight apyretic influence. I have no doubt, further, that the excellent nursing and very favourable surroundings of this lady materially contributed to the successful result. From the date of the perforation till the time when the daily expectoration amounted to less than one ounce, she expectorated about twenty-five pints of pus. This discharge was immediately preceded, as already mentioned, by the expectoration of a considerable quantity of albuminous fluid.

There has been considerable controversy about this subject of albuminous expectoration following paracentesis, particularly in France. In further discussing this, I have to acknowledge my indebtedness to an excellent summary of the discussion among the French physicians, to be found in the *BRITISH MEDICAL JOURNAL* for October 1873.

This peculiar expectoration following paracentesis is comparatively rare. When it does occur, it generally comes on within an hour or so after the operation, in the form of a more or less abundant expectoration of what is essentially serous fluid. It is accompanied by dyspnoea, more or less severe, and by the physical signs of oedema of the lung. In a certain number of cases, the oedema is so intense as to cause death. A number of explanations have been brought forward as to the cause of this kind of expectoration. Passage of the pleural fluid through a perforation of the lung, by means of the trocar or needle of the operator, is one. This, by the way, is not an unlikely accident; but in most of the cases noted there was effusion in large quantity; so that the lung was well out of the way, and indications of such an accident were completely wanting. A second explanation is, that spontaneous perforation of the lung takes place. To this a number of weighty objections are urged. This expectoration, for instance, was found to follow four successive thoracenteses performed on the same patient; so that, if that idea be correct, perforation must have taken place each time. It has also been objected that spontaneous perforation, though occurring in empyema, is rarely, if ever, seen in serous pleurisy. A third explanation is that it is due to a species of transudation of the pleural fluid through the pulmonary vesicles into the bronchi, an explanation which most writers have considered thoroughly insufficient. The fourth explanation, and that usually adopted, is that the fluid expectorated is not of pleural origin, but the result of pulmonary oedema. Various explanations have been given of the cause of this oedema. First, it is supposed to be caused by the air suddenly entering the previously compressed lung, and leading, by its irritation, to congestion. Here the question arises, why has the air no such effect on the lungs of newly born children. Dr. George Johnson, dissatisfied with this explanation, maintains that it may be due to coagula in the pulmonary veins, leading to capillary stasis, and consequent oedema, a transudation similar to what occurs from the Malpighian capillaries in albuminuria. Another opinion is that it is due to vaso-motor paralysis of the vessels, said paralysis being due to the excessive pressure to which the lung has been subjected by the effused fluid, the inflation of the lung allowing the vessels to become overfilled. However we may seek to explain this fluxion to the lung, it is generally considered to be the most likely cause of the albuminous expectoration. At the same time, it appears to me that there is a confusion between cases of pulmonary oedema, such as may be induced by a variety of causes, and those cases directly due to operative interference. There are few physicians who have not seen cases of acute and severe oedema of the lung; such cases, by the way, brilliantly relieved by general blood-letting. I have no doubt, therefore, that many of the cases recorded, particularly of the more severe kinds, were due to fluxion to the lung, in whatever way that fluxion may have been caused. Making all due allowance for such cases following such interference as paracentesis, I am satisfied that a great many of the recorded cases are due to passage of the pleural fluid by perforation, either spontaneous or traumatic. It has been argued against this, that the expectoration has been known to occur in cases of empyema, where, if any fluid should pass, it ought to be pus. I have no doubt that these cases, at all events, were cases of filtration, through the lung, of the more fluid portions of the pus, as in my case. My impression is that the perforation which took place was precipitated by the operation. The removal of even a small portion of the pleural fluid by

paracentesis must necessarily affect the physical conditions of the lung. It seems as if the danger lay in the too free use of aspiration—in the attempt, futile though it must be, to exhaust more or less the pleural cavity of its fluid contents. The pressure, in such circumstances, upon the lung is very likely to lead, in a certain number of cases, to perforation into the lung, and passage of some of the remaining pleural fluid. Albuminous expectoration ought to occur much more frequently if it were due to the ordinary cause of pulmonary oedema. Why is it so rarely seen in cases of pulmonary oedema apart from thoracentesis?

Some of the difficulties surrounding this question will be cleared up as the operation of thoracentesis becomes more common. Meanwhile, I instance my case as one where albuminous expectoration occurred immediately after the operation of paracentesis, and under such circumstances as make it clear that it was not due to oedema of the lung. I have no doubt that many of the recorded cases can be explained in the same way.

[June 12th, 1876. Since the above was written, my patient has enjoyed excellent health, and has suffered from no chest-symptoms whatever.]

FREE INCISION, *VERSUS* THE ASPIRATOR IN EMPYEMA.

BY ANTHONY BELL, L.R.C.P.,

Senior Assistant Surgeon to the Newcastle-upon-Tyne Infirmary.

HAVING always held a strong opinion regarding the vast importance of a free incision in empyema, and having treated several cases successfully by this line of treatment, perhaps a brief history of my last three cases may not prove uninteresting. I have never lost sight of my patients, and, upon inspection last October, found them in perfect good health.

CASE I. M. A., aged 19. On February 15th, 1869, I met his medical adviser in consultation. The patient had suffered from an attack of pleurisy of the left side. He was propped up in bed and gasping for breath. His pulse was 144; he was much emaciated, and troubled with a short dry cough. The left side was dull on percussion; the heart pushed to the right side. An exploring needle revealed pus. A free incision was made into the pleural cavity. No drainage-tube was required. The cavity was not syringed. The wound was poulticed; and it closed in about two months. The weight of the lad when he first went out was 7 stones. In October, 1874, his weight was 11 stones 11 pounds.

CASE II. Mr. W., aged 34, stated that he had been under treatment for a period of six months, and that his illness commenced with a severe pain in the left side, accompanied by cough and difficulty in breathing. He was emaciated and extremely weak. His weight was 8 stone. The whole of the left side of the chest was dull on percussion, and the heart was pushed to the right of the sternum. An exploring needle revealed pus. A free incision was made into the pleural cavity, and over 40 ounces of pus were evacuated. The cavity was daily syringed with warm carbolic lotion; no drainage-tube was required. The wound was poulticed, and the opening closed three months afterwards. In October 1874, his weight was 10 stones.

CASE III. On May 18th, 1874, I visited Mr. O., aged 36, and found him suffering from a smart attack of pleurisy of the right side. He was being treated by his medical adviser by hot applications, which were continued by myself. With my utmost efforts I failed to arrest effusion and produce absorption. On July 15th, he complained of shortness of breath and troublesome cough, with profuse expectoration. He was much emaciated, and suffered from night-sweats; pulse 104; temperature 98.3 degs. On inspection, I found the right side almost stationary. The intercostal spaces were flattened and somewhat widened; but there was no perceptible enlargement of the right half of the chest. Upon percussion, there was dullness in front from the liver to a little above the nipple, and behind from the liver to within an inch from the spine of the scapula. There was absence of respiratory murmur, vocal resonance, and vibration. The infraclavicular space of the same side was resonant, and there the respiratory murmur was harsh. The left side was normal. The aspirator-needle was inserted between the seventh and eighth ribs, and over 30 ounces of thick laudable pus were withdrawn. Great relief was afforded by this operation. A dose of chlorodyne was then given.

On July 16th, the pulse was 100; temperature 102.2 degs. He stated he could breathe with his right lung.

On July 17th, chloroform was administered, and a free incision made at the site of the puncture into the pleural cavity. More than 20 ounces of pus without odour were evacuated. A pad of tenax was applied. The chlorodyne was repeated.

On July 18th, the pulse was 100; temperature 98 degs. There had been no cough nor difficulty of breathing since the first operation. The cavity was syringed night and morning with warm carbolic lotion.

On July 20th, the opening seemed to be closing too quickly, consequently, a drainage-tube was inserted. Tenax was substituted for the poultices, as it was found lighter and cleaner.

On July 21st, there was a free discharge from the tube.

On August 7th, the patient was up. His weight was 8 stones 5 pounds.

On August 28th, only a little serum exuded from the tube in the morning.

On September 18th, he went down to the home.

On September 28th, the tube was removed. The wound then closed, and healed in three days. In October 1874 his weight was 10 stones 11 pounds. His weight in March 1875 was 12½ stones.

[Mr. Bell forwarded with his paper photographs of all three patients, taken in October 1874. The men were evidently at that time in good condition. In each case, the skin was puckered in at the site of the healed opening into the pleura; which, in every instance, was just below the anterior margin of the axilla, between the seventh and eighth ribs; and so situated, that the nipple of the same side lay about midway between the cicatrix and the middle line of the sternum. In Cases I and II, the puncture was made into the left pleura; in the third case, the opening was on the right side of the chest. The side which had been diseased seems at that date to have been no smaller than the opposite healthy side; and, altogether, upon paper, the results appear highly satisfactory.]

CLINICAL MEMORANDA.

EAR-DISEASE AND LIFE-ASSURANCE.

ERE the interest on the above subject, which was called forth by a communication in the JOURNAL on June 17th, by Dr. Thomas, passes away, and as he, as well as many others, may be under the impression that this subject has hitherto escaped notice, I ask the favour of space in order to say that this impression, if made, is erroneous. So long ago as 1860, Toynbee, in his work (p. 344), drew attention to it, but in the briefest possible manner; while, in January last, I read a paper On Unrecognised Ear-Disease in relation to Life-Assurance, at a meeting of the Medico-Chirurgical Society in this city, an abstract of which paper and the discussion that it elicited may be seen in the report of the meeting in the *Glasgow Medical Journal* for April. I cannot lay claim to priority in bringing this matter before the profession, but I do claim to be the first aural surgeon who has gone fully into the subject, more fully than any foreign writer, so far as I know; certainly more fully than either Toynbee or Dr. Thomas, who are the only English writers on the subject; whilst, in point of time, I have forestalled the last-named gentleman. Besides suggesting to the assurance-offices the pressing need of a direct question in their proposal-forms as to the past and present history of the organs of hearing, I have laid down principles to guide their referees in regard to cases of ear-disease; in fact, in that paper I endeavoured to exhaust the subject of "ear-disease in relation to life-assurance", and I believe I have done so. The paper, I may add, is based upon a wide and what, I think, is an unique experience of life-assurance ear-cases.

JAMES PATTERSON CASSELLS, M.D., Glasgow.

THERAPEUTIC MEMORANDA.

C U C A.

I HAVE recently made several trials of this drug; and, although circumstances have prevented my undertaking such a crucial test as that detailed by Sir R. Christison, I am convinced that it greatly relieves muscular fatigue, though only for a limited time (between two and three hours). The first specimen I procured, although from one of the foremost metropolitan chemists, was absolutely inert; and I am afraid that most of the cuca at present sold in the shops is in like condition. Messrs. J. Bell and Co. of Oxford Street have lately furnished me with a much better sample; and, by comparing this with others, I conclude that good leaves have three distinguishing characteristics: a tea-like odour, a warm pleasantly pungent taste, and a dark green colour. In bad specimens, the odour is camphoraceous, the colour brownish grey, and the pungent taste wanting.

The bulk of the dried leaves is a great hindrance to a more general use of cuca, the ordinary dose of a drachm and a half being equivalent