interspaces, one and one-half inches outside the nipple. Epigastric pulsation.[1] Liver edge two and a half fingers below the costal margin. Her lips were rosy; she was in fair condition, and could walk. Taking into consideration the extreme cardiac displacement, the position of the liver, and the physical signs, I thought there must be fluid. Several times I explored, and on each occasion entered fibrotic lung. Finally I obtained fluid from the axillary region. It was suggested at the time that a dilated bronchial tube containing pus had been tapped; but five ounces of pus were evacuated from her chest.

In the dry stages a friction sound is the only evidence, but pleuritis may be inferred from the symptoms. The several other possible causations of pain under the left nipple must be remembered. Given effusion, is it serous or purulent? The fact that it accompanies an exanthem with perhaps diarrhœa, sweating, a sallow complexion, marked wasting, and an obviously low state of health, are in favor of pus,—*in favor*, mind. Temperature, as a diagnostic sign between the two, is worthless: it may be high with serum, normal with pus. Exploration with a hypodermic syringe fitted with an exploring needle is alone reliable. Upon its passage into the pleural cavity, a fibroid, pneumonic, or crepitant lung will be readily felt. If it passes into the pleural cavity, fluid may not flow on account of fibrinous blocking of the needle. Pus may come from a dilated bronchial tube. In one case autopsy showed a pneumonic lung riddled with abscesses, where puncture almost anywhere would have withdrawn pus. If conducted with proper precautions no danger need be feared. Recently, however, in a case of mine, although the position of the heart was not in favor of fluid, the resident explored for pus and withdrew ten minims. The child coughed immediately, blood poured from its mouth and nostrils, and death occurred from asphyxia. A necropsy disclosed a cirrhosed lung with dilated pus-containing tubes. A large vessel had been punctured. Some few cases are tubercular. Is this tuberculosis? The observer must watch for signs of cerebral implication in the shape of ocular or facial pareses, weakness of a limb, a cerebral pulse, respiration of irregular rhythm or Cheyne-Stokes type, great frequency without sufficient pulmonary cause, paroxysms of cyanosis, optic neuritis, tubercles in the choroid,[2] and convulsions, vomiting not obviously peritonitic, a prolonged and irregular temperature without evidence of imperfect drainage or

[1] Right-sided cardiac hypertrophy also displaces the apex to the left.

[2] Tuberculosis of the Choroid, by George Carpenter. Illustrated Medical News, December 7 and 14, 1889. Plates. British Medical Journal. Plates.

sepsis, and œdema of the hands and feet. A tubercular history and the presence of tubercular lesions elsewhere must receive due but not too weighty consideration. A fluid effusion is sometimes difficult to diagnose. A child of six, a cured empyema, was thought to have typhoid. There was comparative dulness and somewhat deficient breathing, quite compatible with her history. Three times she was most carefully examined. After fifteen days a swelling appeared over the scar, and a quantity of pus escaped. A large pericardial effusion may be mistaken for pleurisy. A carefully mapped-out area of dulness will negative free fluid, but it might still be a localized empyema. A hydatid cyst or an abscess between the liver and diaphragm or in the liver would give the signs of fluid localized to the corresponding axillary region. Short of an operation and digital examination, its origin cannot be decided upon. The same remarks apply to perisplenic abscesses. By careful mapping, a lung invaded by mediastinal new growth will not cause trouble, and when fluid is present in the sac its cause can be determined. Dropsy of the pleura is both-sided, and is not common in heart-disease, congenital or acquired. Double hydrothorax in acute Bright's disease has been mentioned. Apart from these, double pleurisy suggests pneumonia, tuberculosis, pyæmia, or septicæmia. The duration of pleurisy may be brief, a few hours only. Serous effusions usually clear up rapidly. Aspiration sometimes, from admission of air or from instrumental contamination, renders serous effusions purulent. I think that empyema starts as such, but some hold to the contrary. The fluid does alter in character sometimes: thus, I have seen at the first aspiration sero-pus, at the second clear blood-stained fluid, at the third laudable pus. On absorption redux friction may occur. The physical signs from fibrinous deposition occasionally do not altogether disappear for some time. Pus may become absorbed. Thus, pus was withdrawn from the right base. Some days afterwards, when prepared for operation, the physical signs were rather in favor of solid lung. Several dry punctures were made into solid lung. The chest-signs finally cleared. The quantity of pus was probably small. From absorption and non-corresponding lung-expansion are found the chest deformities already described. Rarely the pus is stinking: this may be from communication between the pleural cavity and the bronchial tubes. With a large effusion, sudden death may occur from failure of the respiratory centre, œdema of the opposite lung, or twisting of the inferior vena cava. Persistent consolidation of the upper lobe may remain with even a moderate empyema. Thus, in a child of two, with left empyema,

consolidation of the upper lobe persisted for two months, and then rapidly cleared. In another under two, similar consolidation continued for eight months after the empyema was cured. Mercurial inunctions were tried. Two months later there were signs of resolution, resonance returned, breathing was vesicular, entry of air fair, and a few râles. General condition excellent. I do not doubt that he quite recovered.[1] These cases seem to be pneumonic. Signs of progressive breaking down of the lung, in the shape of gurgling râles, fever, wasting, and obvious going down hill, betoken phthisis. Some die of general tuberculosis, others of exhaustion. In the early stages the autopsy may show suppurative peritonitis, pericarditis, meningitis, and mediastinal implication. Others die of pneumonia of the affected or opposite lung; some of œdema of the lungs. A serous or purulent effusion may be discovered on the opposite side, having passed undiagnosed. A male of three and three-quarter years had a chocolate-colored effusion in the left chest, both lower lobes collapsed and tuberculous, and in addition general tuberculosis.

I have already mentioned localized and multiple empyemas. The collapsed lung lies in the apex of a groove between the spine and the mediastinum; its position is determined by the root. Old adhesions will alter this arrangement. When adherent to the pericardium, the heart may be pulled from the chest-wall. On section airless and of a violet color, losing its contained blood it becomes slate-gray, smooth, and dry. The pleura may be thickened one-sixteenth of an inch or more, the septa dense, the tubes empty or pus-containing, sometimes dilated. First there is simple compression, later inflammatory cell-growth, chiefly in the septa, one method of production of the cirrhotic lung.

Simple uncomplicated effusions tend to rapid cure. In double hydrothorax with acute Bright's disease the outlook is bad, as also in empyema secondary to renal mischief. Double hydrothorax in heart-disease betokens a failing heart. When tubercle starts the process a fatal termination may be expected. Pneumonia or broncho-pneumonia as the starting-point adds to the risk, and the onset of pneumonia is of grave omen. Of the seven deaths mentioned, there were one from mediastinal new growth, one from pyæmia (bone), one from pneumonia, three from tuberculosis, and one from exhaustion after several aspirations.

[1] Recently this child attended my out-patient dispensary. The chest was quite healthy, and, with the exception of scarring, no difference could be detected from the opposite side.

Uncomplicated empyema cases do well if taken early. In cirrhotic cases the prognosis is that of the accompanying heart-disease. Prolonged suppuration any time over four months is apt to produce lardaceous viscera. Of thirty-one deaths from empyema there were five cases of pneumonia on the same or opposite side, two had peritonitis in addition, and one tubercular meningitis, four succumbed to tuberculosis in one form or another, one to scarlatinal nephritis and exhaustion, one to interstitial nephritis, two to exhaustion, one with cheesy tracheal glands, two died suddenly, two died out of the hospital, one was undiagnosed (coma and convulsions), two had lardaceous disease, one had pus in the abdomen, one pyæmia, in four post-mortem was declined, one died of (?)peritonitis, one with fetid pus, one on operating-table, one while washing out the cavity (convulsions, high temperature), one from abscess and gangrene of the lung.

For the relief of pain and cough nothing is better than small, frequent doses of opium in the shape of pulv. ipecac. comp. In a robust child, three or four leeches may be applied over the seat of pain. Dry-cupping is also useful. Cold may be applied by an ice-bag, but this in young children not infrequently induces collapse, and therefore, if used, it should be carefully watched. Warmth may be employed by heating cotton-wool or Gamjee tissue, the painful spot being painted with glycerin and belladonna. Frequent changing being necessary for the application of these measures, they are not recommended, and the same objections hold for cold compresses. Hot fomentations, with or without opium, changed hourly, are beneficial, but they induce a pustular dermatitis. Poultices, being heavy, are not advocated: they should, if used, be changed every three hours. A cotton-wool jacket is useful. Greater immobility may be obtained by strapping the chest: this should pass on to the healthy side for a couple of inches back and front. An abdominal binder for the restraint of the diaphragm will sometimes prove beneficial. The child should be put to bed, and the room kept at a temperature of 65° F. The bowels must be opened and a saline mixture administered. The diet should be fluid. With effusion, three points require attention,—viz., the quantity and the quality of fluid effused, and the duration. If the pleural cavity is full, aspirate at once, lest sudden death anticipate you. By quickly opening the chest and performing artificial respiration, I once revived a child who had ceased breathing. Simple fluid, even if moderate, should not be left *in statu quo* longer than three weeks, lest the lung contract adhesions. If there is still fever, do not aspirate, as the fluid is sure to reaccumulate. Do not use a sharp hollow needle, or you will wound the lung. It is

not necessary to remove all the fluid: withdrawal of a moderate amount will suffice. Cease aspiration as soon as the child commences coughing. Sometimes two or three aspirations will be necessary. The bowels should be kept open, and a diuretic mixture containing digitalis administered, to which may be added iodide of potassium. The dull area may be painted with tincture of iodine daily. I find it a good plan to rub into the chest for ten minutes, night and morning, Scott's ointment. This may be mixed with unguentum iodi. This method is useful with damped breath-sounds from thickened fibrin. If pustular dermatitis appears, the application should be temporarily stopped. A useful plan is to limit the quantity of fluid to half a pint in the twenty-four hours; the solid diet which you will be now giving your patient must then be presented as dry as possible.

There is only one method of dealing with empyema, viz., immediate evacuation. Aspiration may be resorted to, but its usefulness is limited. It is sometimes successful when the empyema is small, is useful for young infants, or where the shock of operation would be dangerous, or preliminary to incision when the chest is very full. Another method is the passage of a medium-sized trocar and canula into the chest. Through the canula a divided rubber drain with glass insertion may be directed after the canula has been removed. The skin grasps the chest end, the other passes into a quart-glass measure, under the cot, containing some antiseptic solution. This is the siphon plan. The tube in the chest quickly loosens, the siphon action soon ceases, and the case is difficult to manage in other respects and to keep aseptic. Of all methods, simple incision through an intercostal space is the best. As regards site, it does not matter much: some advocate one, others another. The axillary interspaces are widest. With local collections, the incision must be guided by the site of the pus, and then at its most dependent position. If pointing, it may be opened there or elsewhere. Here empyemas are generally opened in the seventh or eighth interspace behind, and a large-sized rubber drainage-tube inserted. We use a rubber tube to which a rubber shield is fixed. I like it to pass into the pleural cavity and no more, just sufficient to keep the wound patent and allow free drainage. I also employ a short silver tube with a shield.[1] When there is much pus, it is better on the insertion of the tube to allow it to drain away gradually into a sufficiently thick antiseptic dressing. Serious consequences may follow

[1] A nest of three is made by Messrs. Down Brothers, of St. Thomas's Street, London Bridge, from my specifications.

sudden disturbance of the mechanism of the lung, such as œdema, frothy expectoration, and possibly suffocation. Fibrinous masses presenting at the wound must be removed. In a girl of three, I once removed two fluidounces by measure of membrane on the third day. Hemorrhage at the time of operation is rare. Dangerous collapse and cessation of breathing sometimes occur, and must be treated on the usual lines. Many of the cases were treated under carbolic spray. To say nothing of other drawbacks, I think its chilly blasts were responsible for two cases of pneumonia.

At this hospital, Sir Joseph Lister's methods of antiseptic dressings are adopted all through until the wound is superficial, when a simple dressing is employed. The tube is to be removed, cleansed from pus and fibrinous casts, and replaced. When it has entered the pleural cavity a rush of air passes through the tube. After a few days the discharge becomes serous. The tube may be driven out by coughing from squeezing of the ribs or impact of the re-expanding lung. When the discharge is trifling, a drachm or so, the tube may be discarded. There is no time-limit; occasionally a week is sufficient. In the course of a few weeks I have several times seen it surrounded by a tunnel of bone. In some cases several of the ribs are united by bony growths. With reaccumulation of pus there are two indications, a rise of temperature, sometimes not much above 99° F., and alteration of physical signs. Rise of temperature does not necessarily mean imperfect drainage or reaccumulation. In several cases it was due to scarlet fever or measles, in others to pneumonia, tonsillitis, general tuberculosis, or peritonitis, sometimes to no apparent cause, and again it appeared to be owing to a small superficial collection of pus about the wound. Conversely, a subnormal temperature need not cause alarm: this is very common in childhood, and not infrequently the temperature may be as low as 95° F. The lung can often be seen at the bottom of the wound, of a slaty color or lymph-covered. It may remain motionless or appear close to the chest-wall. With a large cavity a considerable rush of air will be heard. If close up to the chest, the lung-movements appear up and down, and not to and fro. Probing, unless there is a large and obvious cavity, is likely to prove misleading. Even if there is *apparently* a cavity of some extent, the discharge being trifling, an attempt should be made to banish the tube. After operation there is usually fair entry of air, with vesicular breath-sounds, but these may be conducted: it was so in a child with a completely-collapsed lung. When the upper lobe is consolidated, the physical signs persist for a variable period. Below the

wound there may be distant tubular breathing, vesicular murmur, or râles, according to the condition of the lung. Tubular breathing may be conducted to the opposite side, and in this case there will be resonance. With complete sealing of the cavity there may be deficient entry of air and impaired resonance. In aid of this there are several forces,—viz., full re-expansion, or the falling in of the chest with partial expansion, pushing up of the diaphragm, displacement of the mediastinum by the healthy lung. The greater the collapse the more the deformity and the greater the strain on the right heart. Cases of a few days' or weeks' duration are discharged showing merely a scar, sometimes flattening under the clavicle or about the nipple, or slight chest-shrinkage and some lateral curvature. Time and a healthy constitution will efface such traces in many cases. Expansion of the lung is induced by coughing, crying, and breathing with closed glottis. The atmospheric pressure is greater *via* the bronchi because the dressing acts as a valve, preventing the escape of air from the sac. Rarely is it necessary to excise ribs. When a child has for several months worn a drainage-tube with a profuse discharge, and when the lung shows no signs of re-expansion, or none beyond a certain point, it is advisable to facilitate the fall of the chest on the lung. Symptoms of lardaceous disease make the closure of the cavity imperative; but do not wait for these. In chronic cases, where the chance of re-expansion is remote, it is best to resort at once to subperiosteal resection. Sinuses remain in some few cases and necessitate resection. Such may be owing to a necrosed rib merely. Thus, in one child many inches of rib were exfoliated. Washing out the pleural cavity serves no good purpose, and is dangerous. Patients have died from coma, convulsions, and hyperpyrexia. If the pus is stinking, the washing-out may be tried, but even then I have seen no good results. Carbolic acid and mercurials are readily absorbed. Lotio sodii chlor. one in fifteen has not this drawback. Do not keep your patient in bed longer than necessary. If he be old enough and can walk around the room without fatigue, he should be allowed to do so. Increased work is then thrown upon the lungs, and a fuller expansion invited. The day after operation, provided chloroform sickness has passed, he may have solid food. Cod-liver oil and wine of iron are to be administered. When the wound is superficial, or before that, if possible, he should be at the sea-side, and for this purpose I know of no better place than Newquay, in Cornwall, with its equable climate and invigorating Atlantic breezes. In a small section pus reaccumulates and requires reopening of the wound, sometimes resection. Thus, one case on each occasion healed, after

twice presenting herself for treatment, and finally underwent resection. The disease in this case extended over a period of five years. Now she is fast approaching womanhood, and the chest, with the exception of scarring, shows little if any trace of the empyema. From my experience gained as resident medical officer and registrar here, and subsequent acquaintance with many of Dr. Goodhart's and Dr. Taylor's old cases in my out-patients, I can tell you that the treatment of empyema by early incision is most encouraging and successful. Unfortunately, feebly-organized tissue invites tubercular deposits. Thus, in a cured empyema patient aged six it was so in the adhesions. She died of tubercular meningitis. There were no tubercles elsewhere. Finally, I have seen a serous effusion on a cured empyema side three years later; also pus on one side, serum on the other.