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PART I.
ORIGINAL COMMUNICATIONS.

ART. I.—*Contributions to the Diagnosis of Empyema, with Cases.* By ROBERT L. MAC DONNELL, Licentiate of the Royal College of Surgeons, Ireland ; Demonstrator of Anatomy in the Medical School, Park-street.

THERE is not, perhaps, a subject connected with the progress of modern medicine more remarkable than the fact, that the sources from which the diagnosis and treatment of some of the most important diseases are derived, have had their origin from one or two isolated but well observed examples of these particular affections. And in some instances, no doubt, they were recorded, rather as being curious and interesting in themselves, than with the expectation that they would throw light upon the obscure class of diseases to which they belonged. Thus, for instance, our knowledge of the diagnosis of Abdominal Aneurisms, dates from the publication of the case of Mr. M. recorded by Dr. Beatty ;* we knew nothing of the *positive* diagnosis of Pericarditis

* Dublin Hospital Reports, vol. v.

previous to the appearance of Dr. Stokes's paper on the subject,* though Collin and Latham had previously mentioned the very signs upon which the diagnosis is founded. We were equally ignorant of the symptoms and signs peculiar to Cancer of the Lung until Dr. Graves† recorded his interesting case. Our familiarity with diffuse inflammation, phlebitis, and that particular category of affections, commenced with Dr. M'Dowel's‡ memoir on Purulent Periostitis; and our knowledge of the phenomena of Glanders in the human subject had its commencement in Dr. Elliotson's§ paper. Many more examples might be quoted in illustration of this view, and it is to be hoped that the cases I am about to detail, will form the nucleus, around which others of a similar nature will be gathered, so as to constitute an additional feature in the diagnosis of thoracic affections, particularly those presenting the symptoms of Empyema or of Encephaloid disease of the lung.

The opportunities I have possessed, both as a student and practitioner, for some years past, of investigating chest complaints, have been very considerable; and for a great portion of that time I have been engaged as clinical assistant to my kind friends, Drs. Graves and Stokes, in the medical wards of the Meath Hospital, where, in the practice of the former gentleman, many of the cases occurred, upon which the observations to be met with further on, were instituted, and I am indebted to his well-known liberality for permission to lay them before the profession. As these observations are not based upon theory supported by ingenious argument, but are the result of careful *bed-side* investigation, it is hoped that their claims to be considered as "contributions to the diagnosis of empyema" will be submitted to the same test.

Though I am well aware of the great inconvenience arising from the introduction of new names into medicine, and from

* Dublin Journal of Medical Science, vol. v.

† Ibid. vol. iv.

‡ Ibid. vol. iii.

§ Med. Chir. Transactions, vol. xvi.

the frequent changing of those already in use, yet I do not think that any other would accurately convey an idea of the nature of the three first cases than that of "Pulsating Empyema of Necessity," which both expresses the great peculiarity of each, and with the exception of the word *pulsating*, is merely the revival of a term, which until very lately was employed to express the bursting of an empyema outwardly.

CASE I.—*Pulsating Empyema of Necessity. A large Tumour appears in the Cardiac Region, which after pulsating for some time, becomes red, tense, and shining, and then bursts, giving Exit to large Quantities of Pus; Death; Post Mortem.*

A woman, aged 28, of dissolute and abandoned habits, was admitted into the Meath Hospital Sept. 6. It appeared from her statement that she had been labouring under symptoms of acute pleuritis for two months, for which she was actively treated. When admitted she was greatly emaciated, suffered from pain in the left side a little below the mamma; she had cough, with bloody streaks through the expectoration, and inability of lying on either side, decubitus being for the most part on the back. Her pulse was 108, small and weak. The *physical signs* were dulness of the left side, commencing a few inches below the clavicle, and extending downwards both before and behind; the left lateral region was likewise dull; total absence of respiration all over this dull portion; the upper part of the left side, both before and behind, was clear on percussion, with bronchitic rales accompanying the respiratory murmur. The lower half of the sternal region was completely dull, and here the sounds and pulsations of the heart were more intense than in any other situation. The whole of the right side of the chest, both before and behind, sounded clear, and the respiratory murmur was loud, puerile, and free from rale. There was no dilatation of the side observed on her admission.

For the next fortnight there was very little change observed; on the 21st however the cough again became very troublesome;

and was accompanied by a copious muco-purulent expectoration, and her breath became intolerably foetid; pulse 106, weak and feeble; respiration 25, and very laboured. She complained of slight tenderness a little below the nipple, but there was no discoloration or œdema of the part. On the 26th a small tumour became perceptible, *every time she coughed*, in the situation of the pain; it was soft, and exquisitely tender to the touch, but not discoloured or œdematous. On the 28th, bronchitic rales were very intense in the right lung, and those in the top of left lung were much increased; the *expectoration had become quite purulent*. When she reclined to the left side the tumour became greatly enlarged, but receded when she lay on the right, and had a distinct fluctuation. On the 30th the tumour had extended considerably, and the expectoration was still *purulent, and very copious*. Pulse 108, and weak.

From the 1st of October till the 15th, she suffered severely from incontrollable diarrhœa, and was reduced to such a state that her stools were passed involuntarily. The tumour had greatly increased, and was now about the size of an orange, it was red, shining, and fluctuating, *and had a strong diastolic pulsation*, which did not convey the idea of being tilted forward by a pulsating body, as occurs in the case of tumours lying on arteries, but it was of an expanding character, and in every part the pulsation was equally strong. *Though frequently examined with the stethoscope the least trace of bruit de soufflet was never discovered*; nor had it the peculiar thrill so frequently felt in aneurisms. On the 21st she expectorated about a pint of green pus, and the bowel complaint received a notable check. The tumour was still more red, tense, and pulsating, and on the following day it burst, and gave exit to about three quarts of extremely foetid pus, and she became exceedingly weak. After the evacuation of the pus the sound on percussion assumed a clear tone. On the 24th the respiration in the right lung was again healthy, and free from rale. The tumour had receded, the respiration in the affected side was just audible, but

without rale. All the metallic phenomena, except *tinkling* and amphoric breathing, were present, and the sound on percussion was quite tympanitic. When the aperture was uncovered a *peculiar rustling or whistling noise was perceived at each inspiration. From this time she began to rally, her strength increased, the diarrhœa ceased, and the purulent expectoration diminished*, and she was able to sit up all day, the pus constantly trickling from the fistula which remained open, and for the next six weeks she had periodical discharges to the amount of two or three quarts every ten days or so. At last her strength again failed, the cough increased, the pulse became quick, but she remained free from sweating. The clavicle and spine of scapula of the affected side became gradually dull, accompanied with feeble respiration, mixed with crepitating rales. The day before her death, which occurred on the 15th of December, a discharge of nearly three quarts of green and fœtid pus escaped from the fistula.

Post Mortem Examination.—The right lung was in every respect healthy, *not the least evidence of bronchial inflammation in any part of it.* On the left side of the chest being opened, the lung was found bound by adhesions to the ribs, for about two-thirds of the pleural cavity, and the remaining third i. e. between the compressed and shrivelled lung and diaphragm, was an empty cavity. The lung was also bound down to the spinal column by two strong bands of adhesion, and its inferior lobe was found red and carnified. The sac of the abscess passed behind the lung also, to a considerable distance; it was coated with a thin layer of organized lymph. The upper lobe of the left lung was the seat of numerous tubercles, beginning to soften, the anterior part of lower lobe was healthy, but the posterior, as before stated, was solid. The fourth rib was quite carious near its cartilage, and the sixth was in a similar condition, and the periosteum covering both was in a sloughy state. Externally the integuments around the fistula were separated for a couple of inches from the subjacent muscles. *The liver was enlarged to*

nearly half its normal size, engorged and full of blood. The intestines were examined with the greatest care, but no trace of disease could be discovered.

CASE II.—Pulsating Empyema of Necessity; two Tumours appear in the lower Part of left Side, presenting Fluctuation and Pulsation; on being opened purulent Matter escapes in large Quantities; Death.

About the middle of June, 1842, I was requested by my friend Dr. Graves to visit A. B., Esq. From the history of the case it appeared, that three years previously he was attacked with pain in the left side, cough, and difficulty of breathing. These symptoms he referred to influenza, which was then very prevalent, but as they continued longer than he expected, and left him in a weakened condition, he came up to Dublin, and placed himself under the care of Dr. Graves, who immediately discovered that he was labouring under empyema of the left side. He remained in town for some time, and appeared to be greatly improved, when urgent business obliged him to go down again to the country, where, from change of air, and perseverance in the treatment advised, his strength increased, his spirits became good, and he was so far recovered as to be able to follow his usual pursuits, which were those of a country gentleman, and even to engage in field sports. For the next two years his health was sometimes good and at others bad: the cough frequently returned, and the difficulty of breathing and pain in the side occasionally annoyed him. For these symptoms he often consulted medical men in his neighbourhood, but it does not appear that he made them fully acquainted with his condition, for the remedies employed consisted chiefly of simple cough mixtures; nor indeed were his habits such as to lead his medical attendants to suspect him labouring under serious illness, for, according to his own statement, he used to join in various amusements, particularly hunting, and frequently has *felt* the fluid moving in his chest when going over a leap. So

little was there in his appearance to excite alarm, that he succeeded in getting a medical certificate on one occasion, when it was necessary to have his life insured, for the examination was confined to the upper and front portion of his chest, and in this way his actual condition eluded observation. From that period till May, 1842, he enjoyed pretty good general health. He now began to suffer from many of the constitutional symptoms of phthisis, and was greatly alarmed by the appearance of two tumours on the affected side, which we shall describe more particularly farther on, and determined on coming to Dublin and placing himself again under the care of Dr. Graves. He was not long in town before I saw him, and his state was then as follows:—He was greatly emaciated, pale, and haggard; his pulse was quick and feeble; he suffered greatly from night sweats; he had a slight cough, without expectoration; difficulty of breathing, and inability of lying, except on the back. He was extremely nervous, and, in short, had all the usual symptoms of hectic, save diarrhœa.

On examining the chest, two large tumours were observed, one situated in the spot usually occupied by the apex of the heart; the other was situated posteriorly, and appeared between the tenth and eleventh ribs, about two inches from the spine. Both of these tumours were alike in the following particulars: they were large (about the size of a Seville orange), soft and fluctuating, not discoloured, but having a few large and varicose veins coursing about their bases. They first made their appearance in the intercostal space, and at the time I speak of, they both possessed a *strong diastolic pulsation*, quite visible, and as strong as that of an aneurism of equal size, but without bruit de soufflet or thrill. It was also easy to perceive that a communication existed between them, for by placing the hand on one, fluctuation could be felt when the other was tapped. The integument in the neighbourhood was not inflamed or œdematous, nor did he suffer any pain from handling the tumours or the parts in their vicinity. Previous to their first

appearance, he suffered considerably in the above-mentioned situations, from a constant pain, increased on pressure, or when the waistband of his trowsers was buttoned ; but this after some time diminished, and two small tumours, about the size of hazle-nuts, became perceptible, and soon attained the size above described. *At first they did not possess any pulsation*, nor was it until they were about the size of a turkey egg that this peculiarity was observed. So much as regards the tumours. The affected side was not at the time I saw him increased in size, when measured at a distance from the tumours, nor had it the well-known barrel shape so common in empyema. It was completely dull on percussion over its entire extent, except for about two inches below the clavicle in front, and to the middle of the scapular region behind. In these situations the respiration was loud, and free from rale, but in every other part of this side, it was completely absent. The heart had left its natural position (now occupied by one of the tumours), and was pulsating strongly and visibly to the right of the sternum under the corresponding mamma. There was no egophony or friction sound heard over any part of the diseased side.

In consultation with Mr. Cusack and Doctor Stokes, it was judged prudent to make an exploratory puncture into the front tumour, the result of which proved that it contained pus. The opening was now enlarged, and about a breakfast-cup full of matter drawn off, from which the patient experienced considerable relief, and the wound was then closed. For the next three or four days nothing worthy of note occurred. Mr. Cusack again saw him in consultation, and on this occasion the tumour at the posterior part of the chest was likewise punctured, and was found to contain pus of the same character as the other. He appeared but little improved, his hectic continued, and an irritative cough annoyed him, and at each cough a gush of matter took place from the tumour. The pulsation, though greatly diminished, did not altogether disappear, and was very perceptible even in the collapsed sac of the abscess.

The tumour in front, which had been punctured first, was now as large as before, and presented a pulsation quite as strong. and it was observed that pressure made on it, tended to empty that placed behind; poultices were applied for about one month, during which time it continued to discharge at least a large breakfast-cup full of good pus daily. The constitutional symptoms, which before were very alarming, now abated; his appearance improved; the pulse fell down to the natural standard; the sweating stopped; the appetite and general strength gradually increased; and his nights were passed without restlessness or uneasiness of any kind. The change in his appearance was not more remarkable than that which took place in the physical signs. The left side of the chest from the level of the cardiac region upwards, became less dull, though by no means perfectly clear, and from being void of respiratory murmur, now presented it, in a tolerably intense degree, accompanied both before and behind by a loud rasping frottement,—so intense, that the patient himself was quite conscious of its presence, and suffered considerably from it, at each inspiration. In a few days all this portion which I have this moment stated, remained rather dull, became almost tympanitic, and from the fact of a metallic resonance of the voice and cough, and Hippocratic succussion being likewise noticed, it might have given rise at first to the suspicion that the untoward accident of an opening into the lung had taken place, but he had neither the symptoms which characterize the sudden formation of a pneumothorax from perforation,* nor those which indicate the bursting of an empyema into the lungs; so that it was clear, that the air which now occupied the place of the pus in the

* “The symptoms commonly observed are the following: a sudden, new, and violent pain, with a sensation as if something had given way, is felt in the lower portions of the side; followed by dreadful dyspnoea, suppression of expectoration, extreme anxiety and general collapse. In addition to these there may be loss of voice and impossibility of lying on one side.”—Vide *STOKES on Diseases of the Chest*, p. 528.

pleural cavity had entered through the external orifice. The heart, which was, as before stated, completely towards the right side, had moved to midway between the mammary regions, and its apex was beating behind the xyphoid cartilage. So far, every thing was going on well, when unfortunately his landlady put damp sheets on the bed in which he and his wife slept. The next morning he had all the symptoms of an acute attack of pleurisy of the affected side, pain, stitch, difficulty of breathing, acceleration of the pulse, and the physical signs of an extensive effusion were again manifested, and the discharge from the open abscess, which had been gradually diminishing, became again profuse.* Under appropriate treatment these acute symptoms were relieved.

For the next six weeks I was in daily attendance on him, and I shall content myself with mentioning, that at the end of that time his health was so much improved that he could dispense with medical care, and was about to return to the country, when he was arrested for debt, and imprisoned in the Marshalsea. At this time the effusion was almost removed; the discharge from the posterior tumour had nearly ceased; the affected side was beginning to contract, and the inferior angle of the scapula was considerably tilted out. The sound on percussion was still somewhat dull, but the respiration was loud, and the heart occupied the space behind the sternum. The upper part of both lungs was examined with the greatest care, without discovering the least evidence of the deposition of tubercle, and as there was complete absence of pyrexia, a recovery, with of course the contraction of the side and the usual amount of deformity, was expected.

Before long, the confinement of a prison produced symptoms which but too clearly showed that phthisis had set in, and

* His wife, who slept in the same bed, was on the same day seized with symptoms of violent pleuritis, and notwithstanding that she was treated most actively from the commencement by Dr. Graves's advice, she died at the end of a week, with all the signs of extensive effusion into the left side of the chest, and pneumonia of right lung.

after a residence there of four months' duration, he was discharged to die of the disease. From the period of his arrest till his death he was attended by my friend Mr. Newland, who has kindly furnished me with full details of the course of the disease; but as these notes have already extended to a great length, I shall pass them over, merely mentioning that he suffered from hectic in all its varieties. His friends refused permission to make a post mortem examination.

By a strange coincidence, I had an opportunity, at the same time, through the kindness of Dr. Graves, of examining a somewhat similar case in a gentleman who had been twice under the care of that distinguished physician. I shall quote the history of his illness as published by Dr. Croly of Mountmellick.

CASE III.—Pulsating Empyema of Necessity.—Two large Tumours appear in the lower Portion of the left Side of Chest, presenting Fluctuation and Pulsation. One of them is opened, and the Pus escapes in large Quantities; Death; Post Mortem.

Case of — Jones, Esq. (abridged from Dr. Croly's account in the 8th volume of the "Medical Press," p. 138).

He had laboured under an attack of bronchitis, pneumonia, and pleuritis with effusion. The urgent symptoms were very much relieved, and he was enabled to resume his usual avocations; still, however, he suffered from febrile exacerbations at evening, and his pulse remained quick.* A few months before I saw him his strength again failed, and his fever increased. The following, according to Dr. Croly, was his condition immediately before he came to Dublin. "There was palpable evidence of empyema. The side was obviously enlarged,

* Dr. Croly thinks the quick pulse was kept up by the unnatural position of the heart. In this view I cannot agree, for I have seen numerous cases in which the heart was under the right mamma, and yet the pulse was quite natural, and there were neither *bruit de soufflet*, palpitations, nor other morbid phenomena present. In this case it indicated the deposition of tubercles.

with protrusion of the intercostal spaces, more particularly between the tenth and eleventh ribs anteriorly and posteriorly, the integuments of which were œdematous and painful, with an erythematous blush, and conveyed to the touch a sense of fluctuation. Even the patient himself at times experienced the sound of fluctuation in the chest. He was unable to lie on the sound side, his usual position in bed being either on his back or on the diseased side. Respiration was partially audible at the posterior part of the left lung, along the side of the vertebral column. This, however, was rather bronchial respiration than the respiratory murmur, or vesicular respiration. The sound on percussion of the same side was dull or tympanitic, according as the patient assumed the horizontal or erect posture, varying with the situation of the contained fluid. I distinctly recognized *metallic tinkling* on applying the cylinder beneath the clavicle. This, with the sound of fluctuation on succussion, were proofs that air as well as matter were contained within the sac of the pleura; that in fact pleuro-pneumothorax existed." Dr. Croly also found that the heart still occupied the right infra-mammary region; and the left lung sounded well on percussion, and remained free from rale. Such was his condition before his arrival in Dublin.

About the middle of June, 1842, Dr. Graves requested me to visit this gentleman, whose case bore so strong a resemblance to that of Mr. B. just detailed. He was then extremely emaciated and pale, his countenance anxious and haggard, and he was bathed in profuse perspiration. His pulse was 120, small, and weak; his respiration 30, laboured. He was sitting up in bed supported by pillows; any other position was sure to induce intolerable dyspnœa. He complained of the excessive difficulty of breathing, and earnestly intreated that the operation of paracentesis should be performed. On examining the chest *two tumours*, each *about the size of a hen-egg* were observed, one occupying a situation a few inches below the nipple, the other presented itself between the tenth and eleventh ribs about two inches from the spinal column. *They were rather tender to the touch, a few*

turgid veins surrounded their bases, the integument covering them was discoloured and reddish, and they both possessed a well marked fluctuation and a distinct, perceptible, and diastolic pulsation. This latter peculiarity was not only evident to the touch, but quite perceptible to the eye ; and as was noted in the two former cases, these tumours were completely devoid of thrill, or *bruit de soufflet*, and the pulsation had all the characters that were observed in the two others. The lower two-thirds of the left side, both before and behind, was completely dull on percussion, the upper-third was quite tympanitic. In no part could the respiratory murmur be distinctly heard. When he spoke, or coughed, the metallic phenomena in the upper portion of this side became painfully developed, but I did not hear *metallic tinkling*, and, of course, in his condition, the experiment of succussion was not repeated. The heart, both by percussion and auscultation, was discovered to occupy the right infra-mammary region. The sound on percussion was quite clear all over the right lung, both before and behind, and the murmur was in every part puerile and without rale. As before stated, the operation was urgently demanded by the suffering patient ; and though the case was so unfavourable that a successful result was not to be expected, yet it was deemed necessary, as he was almost suffocated, and anxiously looked forward to relief from its performance. An opening was accordingly made into the posterior tumour, and a large quantity of odourless pus was discharged, the entire amount was not, however, drawn off, and the wound was closed with adhesive plaster, and soon united. When next examined, the tumour was found as large as before, and again presented the *pulsation* as well marked as ever. From the operation he experienced great relief for a few days, but again the urgent symptoms obliged Mr. Morrison, his regular attendant, to make a second opening, and as soon as the matter began to flow he got ease from the sense of suffocation. For a little while the patient appeared to improve, but he soon fell a victim to distressing hectic. The body was examined by Drs. Croly and Hanlon ; and I shall extract

from the account furnished by the former gentleman all the features of interest which the dissection revealed.

Post Mortem Examination.—On raising the sternum, bands of lymph were seen passing backwards to the right side. An immense cavern presented itself in the left side of the chest, so that nothing was to be seen, except about a quart of sanguinolent matter lying at the bottom. The sides of this cavity were lined with a thick coating of lymph, and gave to it the character of the sac of an immense abscess, across which several bands of lymph stretched from one side to the other. At first the left lung could with difficulty be discovered, but it was soon found lying against the bodies of the vertebræ, compressed, shrivelled up, and bound down. It was studded with tubercles throughout every portion of its structure; they had not commenced to soften, and no communication could be traced between any of the bronchial tubes and the cavity before alluded to. The heart lay to the right of the sternum, its apex being opposite to the fifth and sixth ribs. A strong band of lymph of a ligamentous appearance, arising from the anterior mediastinum, attached itself to the right lung; this, with the adhesion of the pericardium to the diaphragm, fettered the heart to its abnormal position. The pericardium was universally adherent to the heart so closely and intimately, that it could not be separated without removing the muscular fibres of that organ, whose structure was pale and flabby; the valves were all healthy. The right lung was found quite healthy, not a tubercle was discovered in any part of it. Dr. Croly accounts for not being able to trace a communication between the bronchial tubes and the cavity of the pleura, by the fact that the lung was so much disorganized as to prevent a careful examination. It is to be regretted that he did not inflate the lung while under water, by means of a bellows connected with the left bronchi.

REMARKS.

The three preceding cases are no less interesting than important, and, as far as I have been able to ascertain, are per-

fectly new in the history of empyema, there being no mention made of such cases in any of the recent writings on the disease. It is worthy of notice that in all three, large tumours presented themselves in the situation usually occupied by the heart's apex, and in all, the heart itself was dislocated to the right of the sternum; there cannot then be the least doubt as to the source from which the pulsation was derived, and the manner in which it was communicated to these abscesses. The heart, pushed out of its normal position, pulsated strongly and equally against their walls, and their contents being fluid and of equal density, a uniform and diastolic impulse was communicated to all parts of their surface, more intense, of course, in those situations nearest the source of pulsation. This accounts for what was noticed in the three cases, that the pulsation did not resemble that so often observed in tumours lying over large arteries, in which the motion consists in a mere tilting forward, nor was it like that which is seen in ordinary abscesses lying on an artery in which the pulsation occurs, generally speaking, along the line of the vessel, and is scarcely perceptible in any other part of the tumour; but it was uniform, expanding, and strong. In the two last cases, the tumours behind either derived their pulsation from the heart or from the thoracic aorta, and were from their size, situation, and feeble pulsation, more likely to lead us into error than those in front. What are the affections with which these cases might have been confounded by a person ignorant of the actual state of our knowledge respecting thoracic disease, or who, unacquainted with their history, had only seen them for the first time? Thoracic aneurism, and pulsating cancer of the lungs immediately present themselves to our view, and on examination we shall find that they possess some features in common. When compared with aneurisms we have, in both cases, tumours occurring in patients, who for a length of time complained of pain in the side, difficulty of breathing, cough, inability to lie but on one side; whose constitutions were exhausted by the protracted and distressing nature of their complaints, and in whom the outward progress of the disease was marked by severe pain at a particu-

lar point, in which, after a time, a small tumour, of a soft and yielding nature, is observed, which gradually increases in size, is totally devoid of pain, and presents well marked *diastolic pulsation*. But, on the other hand, the history of the last two cases was that of pleurisy with effusion; their duration also (three years) was greater than the average length of time that patients with thoracic aneurisms live,* and at no period did they experience those dreadful, tearing, and lancinating pains peculiar to the latter disease; and, in addition, many of the usual symptoms of the affection were absent, such as dysphagia, *the peculiar aneurismal cough*, a *bruit de soufflet*† on placing the stethoscope over the tumour, and a thrill sensible to the hand; and as far as I have been able to ascertain, aneurism of the thoracic aorta has never presented itself externally in two situations so *widely separated*. They were also distinguished from aneurism in the following particulars: the greater portion of the affected side was dull, and without respiratory murmur,‡ yet the pulsation was *only* felt in the external tumours, in this respect differing essentially from aneurisms, in which the pulsation, thrill, and *bruit de soufflet* (when present) *are most intense at the point of maximum dulness*; and though by pressure on a bronchial tube, aneurisms may prevent the entrance of air into the part of the

* Patients with thoracic aneurisms seldom live beyond two years, and accurate statistics would probably show that they rarely last out so long. I have seen one case in which the disease existed seven years. The patient was under the care of Professor Porter, by whose judicious treatment his life was no doubt prolonged. In this instance, the immediate cause of death was extensive hydrothorax, the effect of pressure on the large venous trunks by the aneurismal tumour, and not from the rupture of the sac.

† I am aware that *bruit de soufflet* is not a constant sign of aneurism; many cases have come under my notice in which it was either absent or intermittent. At present we are ignorant of the peculiar circumstances which determine its presence or absence in aneurisms.

‡ Dr. Greene has given the details of a rare case of aneurism, in which just before death the entire left side of the chest became dull, owing to rupture of the sac and extravasation of its contents.—“*Dublin Journal of Medical Science*,” vol. x. p. 362.

lung to which the tube leads, and thus produce absence of murmur, yet this portion of lung will yield a clear sound on percussion, thus presenting phenomena altogether different from those observed in my cases.

These cases, however, establish the fact, that "empyema of necessity" is liable to be mistaken for aneurism, particularly (as in the first case) when it occurs in the form of *one large pulsating tumour*, and an accurate knowledge of the characteristic features of the two affections is necessary, in order to avoid committing the grievous error of pronouncing an empyema to be an aneurism, or *vice versa*. But we do not anticipate so much difficulty in distinguishing between these two diseases as between such cases as I have detailed, and "cancer of the lung and mediastinum." At the very outset of our investigation a great difficulty presents itself, for we cannot avail ourselves of the aid derived from the history of the disease, for in many of the most accurately recorded instances of cancer of the lung, the patients evidently suffered at the commencement of their illness *from pleurisy excited by ordinary causes, and followed by empyema*, and in other instances where the existence of empyema was not actually discovered, the history of the cases resembled in many particulars that of ordinary pleurisy. But this fact will be more apparent by laying before the reader a brief outline of some of those examples of cancer of the lung, which during life were the most minutely observed, and after death the most carefully examined.

The first on record, which can be of any use in assisting us in laying down rules of diagnosis, is described by Doctor Graves.* This was followed by some interesting cases from Heyfelder,† and lastly, Dr. Stokes has contributed others of extreme value; and in his paper will be found the actual state of our knowledge, both as to the pathology and diagnosis of this disease. In some of these cases, there are many symptoms which

* Graves's *Clinical Medicine*, p. 792.

† *Archives Générales de Médecine*.

are not only common to both affections, but which, before the appearance of these I have now brought forward, were considered as exclusively belonging to encephaloid disease of the lung. In that described by Doctor Graves, the patient at first laboured apparently under pleurisy; and this view of the case seemed confirmed by the following symptoms: "decubitus on the affected side (the right)—fixed condition of that side—stitches on drawing in deep breath. The physical signs were universal dulness, with bronchial respiration all over the right lung; no rale; no resonance of the voice, diminished vocal vibration. At the post mortem examination, the whole right lung was converted into a mass of encephaloid matter; pleura greatly thickened and dense. In Heyfelder's case, the patient was attacked twice with acute pleuritis. When he first saw him he was labouring under acute pain in the left side; stitch on deep inspiration; inability to lie in any position but on the affected side. The left side was fixed, and was likewise *dilated*. The physical signs were *complete dulness all over the left lung, with absence of respiratory murmur*. No œgophony over this side. The *heart was dislocated to the right of sternum*; and in the situation usually occupied by it, *there was a soft, elastic tumour the size of two fists*. The right lung sounded clear on percussion, and in every situation, the respiration was puerile, and without rale. At the post mortem examination, the left lung was found converted into a white lardaceous mass, softened in the centre. The external tumour had sprung from this, and proceeded outwards between the ribs; it was also softened in the centre, and a direct communication existed between these two points of softening. In the remarkable case of Mr. J——, detailed by Dr. Stokes, the symptoms were at first, solely those of pleuritis, attended at the commencement by dulness, occupying only the lower half of the pleural cavity, but which after some time extended all over the right side; and this side, which at first was of equal size with the left, soon became dilated to the extent of two inches. In addition to these symptoms of empyema, he was affected with œdema of the right

side, and the peculiar varicose condition of the veins of the same side, upon which Dr. Stokes lays such stress, became very evident: he lingered on for some time, and died in great pain. At the post mortem examination, a large quantity of pus, amounting to three pints, was found in the pleura. The lung was converted into a "solid, heavy, fibro-cartilaginous mass of a brilliant, white, brain-like colour, interspersed with black spots, of the diameter of a six-pence each, contrasting singularly with the white portion." The liver was "sound, *but somewhat enlarged, and projected about three inches below the cartilages of the ribs*, and at the point of contact with them, presented a very deep sulcus, such as Dr. Stokes has described in his observations on the diagnosis of empyema—a condition of the organ evidently the result of congestive engorgement.

From the short description of these three cases of cancerous degeneration of the lung, we may observe that they all began with symptoms of pleurisy. In all, decubitus could not be borne on any, but the affected side. The physical signs were extremely like those detailed in my cases; and in one (that by Dr. Graves) a soft elastic tumour presented itself behind, very close to where a tumour appeared in two of my cases; and in Heyfelder's, a large soft, elastic, tumour appeared in the inframammary region of the affected side, a position which, in my three cases, was occupied also by soft, elastic tumours. Now, supposing that these encephaloid tumours (for such they were found to be) had possessed the pulsation, which every-day's observation shews, that tumours of the kind are extremely likely to enjoy, how could such a case be distinguished from either of my two last? The grounds of diagnosis could not be derived from the history of the cases,—from the sufferings of the patient,—from the physical signs,—or from the nature of the tumours (presuming the encephaloid masses had pulsation),—or from their position, for an empyema may point, and an encephaloid tumour may form, on any part of the thorax. Nor could the comparison of the physical phenomena of the two sides of the chest afford much assistance; for in two cases of the malignant

disease, and in two of the empyemas, the dulness and loss of respiratory murmur were confined solely to one side. The other lung possessed clearness of sound on percussion, pure respiratory murmur, and freedom from rale. In the third case of malignant disease, and the first case of empyema, the physical signs of bronchitis were evident in the lung of the unaffected side, and *dislocation of the heart* observed in my three cases was also present in the example of encephaloid disease by Heyfelder. But even in these apparently obscure cases, considerable advantage will be derived from an attentive consideration of the points laid down by Dr. Stokes, as diagnostic between encephaloid diseases of the lung, and the ordinary affections of that organ. We have not, for instance, in empyema, the very remarkable varicose and tortuous condition of the venous system, accompanied by œdema of the chest and arm, occurring *only* on the affected side. For though it is mentioned that varicose veins surrounded the bases of the tumours in two of the foregoing cases, yet such a condition of the veins is widely different from that alluded to in Dr. Stokes's paper, and not likely to mislead the observant physician. Nor have we the remarkably persistent bronchitis noticed in the cases by Dr. Graves and Dr. Stokes, and the peculiar expectoration resembling black current jelly, from its admixture with blood. In the case by Dr. Stokes, these symptoms were not noticed at the time the affected side was *dilated*, but appeared after it had returned to its natural dimensions; and the liver was found protruding beyond the ribs for nearly three inches, *though the sides were symmetrical*—a circumstance not as yet observed in ordinary empyema; but to this latter phenomenon I shall return in another place.

These two latter circumstances proved an obstruction to the *intra-thoracic* circulation: the return of the dilated side to its natural dimensions shewed a *decrease* in its fluid contents, consequently, the obstruction must have been caused either by a tumour pressing on some of the large vessels, or by an important alteration in the structure of the lung itself.

The next feature from which information, in doubtful cases,

may be obtained, is the appearance of soft, elastic, and painless tumours in different parts of the body. These were observed in three of the cases described by Dr. Stokes, and presented themselves at a period long subsequent to the thoracic affection; and in a beautiful specimen of cancer of the lung, exhibited at a late meeting of the Pathological Society by Dr. Law, a soft and large tumour of an encephaloid nature appeared above the right clavicle, shortly before death. From what has been said, the occurrence of such tumours on the *affected* side, would greatly embarrass the diagnosis; but the situation in which they form appears to be quite accidental. In Bayle's and Dr. Law's cases, they were situated above the clavicle; in Dr. Graves's, one was attached to the ramus of the jaw, one to the epigastrium, and one to the posterior part of the thorax; in Heyfelder's, one appeared at the infra-mammary region, and another under the left clavicle; and a fifth instance of this coincidence of cancer of the lung, with the appearance of soft, elastic tumours on the different parts of the body, will be found in Forbes's "British and Foreign Review"—No. xxxii., p. 384. The case is extracted from Kerst's "Pathology," and is a remarkable instance of the *latency*(?) of thoracic cancer.

"The patient was a soldier, nineteen years old, who said that about three weeks before his admission, as he was walking, he felt a sudden pain in the ham, and on reaching home, felt a swelling there, which, in twenty-four hours, increased to the size which it presented on his arrival at the Infirmary. At this time, the left knee was much enlarged, but the pain had not increased. There was swelling as large as a goose-egg in the ham, partly compact, partly fluctuating, and on a moderate pressure, distinctly pulsating. Under the notion that it was a false aneurism, compression was employed for some time; but as the swelling increased, and the œdema of the leg came on, the femoral artery was tied; after the operation, however, which in itself was successful, the tumour continued to grow as rapidly as before: the patient *began to cough as if from organic disease of the*

lungs, and gradually sunk. On examining the body, the internal organs were found healthy, except the right lung, which was *completely converted into a brain-like mass*. The tumour in the ham was fifteen inches long, and twenty-four inches in circumference, and adhered firmly to the periosteum of the femur and tibia. On its surface were five sacculi, holding between five and six ounces of a sero-sanguinolent fluid." Suffice it to say, that the tumour presented a well-marked example of encephaloid disease, and was curious from the fact that the artery ran over it, lying imbedded between two of the sacculi.

The presence of cancer in any of the other viscera will, likewise, it is hardly necessary to say, afford most valuable assistance, and the persistence of bronchitic rales, not removable by treatment, and continuing after the affected side has returned to its natural dimensions, constitute a point of dissimilarity of extreme value; for in every case of empyema I have seen, in which bronchitic rales existed, they always disappeared as soon as the effusion began to be absorbed, except in some rare cases, where the deposition of tubercle was rapidly progressing.

PURULENT EXPECTORATION IN EMPYEMA.

The case first detailed differs in some points from those which followed, and presents features which demand a separate consideration. The disease ran an unusually rapid course, if compared with those instances, where the matter of an empyema makes its escape outwards, but particularly rapid when compared with the slow progress of the other two cases, which extended over a period of between two and three years each. This circumstance may be accounted for by the difference in the habits and constitutions of the patients. The health of the woman, previous to the attack of pleurisy, was irreparably destroyed by hardship, syphilis and mercury, and in her cachectic and exhausted condition, any acute affection would, no doubt, have exhibited unusual virulence.

Three weeks after her admission into Hospital, she began to

expectorate matter of a decidedly purulent character ; and bronchitic rales were heard throughout the right lung. A few days after, diarrhœa set in, and resisting every kind of treatment, ceased spontaneously on the bronchial flux becoming greatly increased, for we find it noted on the 21st of October, that she had expectorated a pint of greenish pus, and that the bowel complaint had received a notable check. The post mortem examination proved that the bronchial membrane was in a *perfectly healthy condition, and no trace of a communication between the sac of the empyema and a bronchial tube could be discovered.* The tubercles in the left lung were in a crude, unsoftened state, so that the pus expectorated could not have proceeded from them. We are, therefore, compelled to consider this case as one of those in which the mucous membrane of the lungs and (as occurred also in the present instance) that of the intestines take on a vicarious action, by which an evacuation of pus, either by absorption and secretion, or some other process, is effected, which, as it advances, a corresponding diminution in the empyema is noticed to take place. How the process of absorption and removal of the matter of the empyema and its elimination from the mucous membrane of the bronchial tubes, intestines, bladder, or vagina, is performed, remains an undecided question. Certain it is, that from a very early period of medicine, the process has been familiar to physicians, though overlooked by many late writers on the disease in question. I must not, however, omit to mention that my friend Professor Greene has again directed attention to this subject, in his admirable paper on "*Empyema*," in the 17th volume of this Journal. He details the particulars of four cases of the disease, in all of which copious *purulent* expectoration was a prominent symptom ; and in all there were external tumours, which it was deemed prudent to puncture. In these instances, it was observed that as soon as the matter got exit by the external opening, the quantity of *purulent* expectoration diminished, and the same circumstance occurred in the case now mentioned. Dr. Greene adds—" the first explanation I heard offered as to the nature

and cause of this expectoration, was suggested by Dr. Hutton, in a consultation held on one of the cases detailed. He observed, that he had frequently seen the expectoration to subside and lose its character when an opening had been made for the collection, and had consequently come to the conclusion, that in many cases of empyema, the expectoration was the result of an effort of nature to free the system of purulent deposit through an external outlet, which in these instances was effected through the bronchial tubes."

The paper of Dr. Greene must be regarded by every physician as one of the most useful that has appeared for many years. We learn from it that though a patient present all the symptoms of extensive empyema of one side, with bronchitic rales or gurgling in the opposite lung, and copious *purulent* expectoration, the case is not to be despaired of, nor are we justified in giving a positive diagnosis of the existence of pulmonary abscess.

Whilst acting as Clinical Assistant to my friend Dr. Graves, a patient was admitted into the medical wards of the Meath Hospital, with the following symptoms

CASE IV.—Acute Pleuritis, followed by Empyema, copious purulent Expectoration; Recovery.

He had been in Stevens' Hospital for an attack of acute pleuritis, was treated in the usual manner, and, after some time, was dismissed cured. He again caught cold, and being unwilling to enter hospital, remained at home without any treatment. After a month or six weeks, he and his friends became alarmed at the quantities of purulent matter he expectorated, and he determined on entering the Meath Hospital. He now presented the usual well marked symptoms of empyema of the right side; his pulse was weak, about 90; his breathing rather difficult; his countenance anxious; he had cough, with *copious purulent expectoration*, but no sweating or other symptom of hectic. The two inferior thirds of right side were completely dull on percussion, with absence of respiration. The intercostal

spaces were dilated, and this side was nearly two inches greater in circumference than the other, in addition to which, he had depression of the liver, and loss of vocal vibration all over the dull portion of the chest. The left side of the chest sounded clear on percussion, and the respiration was free from rale in every situation, except about the situation of the large tubes, where there was occasionally heard a loose bronchitic rale, invariably removed by a paroxysm of coughing, attended with expectoration of the purulent matter.

I was glad to find that on the patient's being examined by Dr. Graves, he immediately declared it, as one of those to which Dr. Greene had drawn the attention of the profession; a conclusion at which I had already arrived, for reasons which shall be mentioned hereafter. It was determined to do no more than assist the efforts of nature by supporting the patient's strength, and as he had been greatly reduced by his previous illness and by the privations he had endured before his admission into the Meath Hospital, a generous diet and small quantities of wine were allowed him. He had not been under this treatment a week before his pulse became full and fell down to the natural standard, he lost the anxious expression of countenance, his breathing became easy, and he began to gain both flesh and strength, and yet he continued to expectorate daily *two large sputa-cups full of thick, yellow, "well concocted" pus*. I do not recollect a case that afforded me greater pleasure in observing, or from which greater information was to be derived. At each morning visit we found our patient perceptibly improved; from being haggard and emaciated he became fat, ruddy, and strong; and at each visit his sputa-cup was found full of pus of the character I have mentioned. The progress of the case was most satisfactory, even more so than in those detailed by Dr. Greene, for in his, paracentesis was resorted to, but in our's the entire of the empyema was removed *by expectoration*. At the end of six weeks the patient was discharged without a symptom of his complaint re-

maining, his right side perfectly clear ; no cough, or difficulty of breathing ; pulse natural ; strength restored.

CASE V.—*Acute Pleuritis, followed by Empyema, copious purulent Expectoration ; Recovery.*

The following case came under my observation within the last four months, and I shall extract briefly the notes of it from my case-book. A woman aged 30, mother of five children, was attacked about two months before she came to me with acute pain in the left side, difficulty of breathing, stitch on drawing in a deep breath, and the other usual symptoms of acute pleuritis. She applied for relief to a medical man in this city, and was bled by him and got some opening medicine. From the loss of blood she experienced some relief, but neglected all medical advice till she came to me, when, in addition to the symptoms already detailed, I found the lower third of the left side completely dull and without respiratory murmur, and all over the middle third behind, a loud and rough friction sound could be heard. The dulness extended round under the axilla to the left infra-mammary region; the heart was felt and seen pulsating to the right of the sternum, and its sounds were louder and more distinct under the right nipple than in any other situation. They were not accompanied by any abnormal bruit. The left side was equal in dimensions to the right. When the hand was placed over the dull part behind, no vocal vibration could be perceived; when carried up over the middle third, the friction could be most distinctly felt, and also immediately under the left axilla, but in every other part of the left lung and all over the right, the sound on percussion was clear, and the respiratory murmur was loud, puerile, and without any kind of rale; yet she complained of frequent cough attended with considerable purulent expectoration, which she used to collect in a tea cup for my inspection on every occasion she visited me. This last symptom, together with the state of the pulse, 108, weak and soft, and night sweats, led me to make frequent and most

accurate examinations for phthisis, but I could not discover the least trace of tubercular deposition, nor did the previous history of the patient warrant the supposition, for except the present attack she had always enjoyed good health. There was no enlargement of the liver. I considered the *purulent expectoration* as the result of the peculiar action of the bronchial membrane before alluded to, but the weak and feeble condition of my patient did not warrant me, I conceived, in leaving the evacuation of the effusion to the unassisted efforts of nature; I therefore placed her under a mild mercurial treatment combined with expectorants, blisters to the side, and a generous diet with the cautious use of wine. This was a plan of treatment against which strong arguments, grounded on the presence of purulent expectoration, sweating, and quick pulse, would have been urged some years ago, with all the appearance of experience and sound judgment for their authority; but through its agency, and the efforts of nature, the entire quantity of the effusion was removed, and the patient was restored to health in about a month from the time she first presented herself to me. After the mercury had slightly touched the gums, I placed the patient on the use of infusion of bark, as I did not consider the use of iodine necessary in her case. I have purposely omitted an account of the changes in the physical signs during her recovery, as they differ in no material point from what is ordinarily observed in such cases.

Before the appearance of Dr. Greene's paper, these cases would have been considered as hopeless examples of pulmonary abscesses, or at least of empyemas bursting into a bronchial tube. This leads me to make a few remarks, suggested by the close observation of some cases of empyema, which have terminated by purulent discharges from the bronchial tubes. There are two modes by which this process is effected; in one, the membrane *takes on a vicarious action*, by which large quantities of pus are discharged *without any distinct evidence of inflammation being set up in the membrane, or communication being established between the bronchial tubes and the sac of the abscess.*

In the other form, a *direct* communication exists between the bronchial tube and the sac of the empyema. They are both efforts of nature to get rid of the purulent collection and effect a spontaneous cure, but as the means adopted are so widely different, an equally opposite train of symptoms, may naturally be expected to attend these processes, and such we find to be the case.

In the examples detailed by Dr. Greene, and in those which I have given, the expectoration was thrown up *in small quantities at each paroxysm* of coughing, and though it amounted to a considerable quantity during the twenty-four hours, yet what followed each paroxysm of coughing never occasioned any distress to the patient, or alarm to his attendants, and was excreted gradually and regularly, without producing any violent or distressing symptom to the patient; and the removal of the empyema, as shown by diminution in the extent of the dullness and return of respiratory murmur in the affected side, was equally gradual and progressive. But, in the second class of cases, where a direct communication has been established, we have, in addition to the rapid development of the physical signs denoting the accident (such as the sudden removal of the dullness, with metallic phenomena of the voice and cough, and a tympanitic sound over the portion of the chest previously dull), *a violent and sudden paroxysm of coughing, usually accompanied with expectoration of a large quantity of pus, so great as in almost every instance to produce the most alarming symptoms of suffocation, and not unfrequently even death from this cause.** This is followed by relief for a time, but a second and third accumulation of the matter takes place, which is again got rid of in the same way; and on each occasion the patient's life is in imminent danger from asphyxia.

I have now seen three instances of empyema terminating in

* See Hodgkin's Lectures on the Morbid Anatomy of the Serous and Mucous Membranes.

this manner, and the particulars of a fourth have been communicated to me; and though a pretty frequent, it is by no means a very desirable mode of cure.

In my first case, the expectoration, though copious, purulent and foetid, was never thrown up in the manner indicative of a direct communication with the pleural cavity, nor was any such communication discovered at the *post mortem* examination, neither was there evidence of bronchial inflammation, and, as before stated, the tubercles being hard and crude, could not have supplied the pus so abundantly expectorated; the conviction, therefore, is forced on us, that, in this particular instance, we have a direct confirmation of the doctrines advanced by the ancient physicians, and more recently enforced by Drs. Hutton and Greene; and were evidence wanting, it is supplied by the occurrence of the uncontrollable diarrhœa, which, resisting every kind of treatment, received a decided check on the purulent expectoration being established; and it is also remarkable, that the inspection of the intestines afforded no explanation for the occurrence of this latter formidable symptom. Heretofore, the efforts of nature in this woman were unavailing, and, as an additional one, she endeavoured to procure the evacuation of the fluid by an external opening; but the shattered and broken down constitution of the patient was unable to bear up against processes so slow and wasting, and she fell a victim to the disease in spite of the great exertions made by nature for her recovery. The post mortem examination showed that the layers of lymph, lining the opposed surfaces of the pleura, were exceedingly thin; and this will account for a circumstance in which this case differed from the two which follow it, viz., that after the evacuation of the fluid of the empyema, the sound, from being dull, immediately became clear. Many treatises on auscultation assert that after the removal of the effusion, the sound becomes clear. This is not strictly true; for if the layers of lymph be unusually dense, the sound will still remain somewhat dull, and Dr. Stokes has shown that in empyema of long standing, the ribs become hypertro-

phied—thus constituting another cause for dulness. In our case, the clearness of sound was explained by the small quantity of lymph found lining the sac of the abscess.

The mode by which the matter works its way externally has not been sufficiently investigated. In some instances an abscess forms in the integuments, which opens both inwardly into the pleura, and externally through the integuments. But in other cases, there is no such abscess, and the process commences on the inner surface of the costal pleura. Thus Dr. Hodgkin* thinks, “that in some cases, the process resembles one which more frequently occurs in the peritoneum; viz., that when a considerable quantity of the inorganizable product of inflammation is collected, ulcerative absorption takes place in that part of the serous membrane with which it is in contact, and that, by a communication of the same process, the external opening is effected.” In our case, the lymph was uniformly diffused, and in no part was it collected in any considerable quantity; and, as far as one instance goes, it confirms the observation of Laennec, who considers that it is by means of gangrene and ulceration of the pleura, that the fluid works its way outwards, and that destruction of the periosteum and caries of the ribs, are frequent accompaniments of the lesion.†

METHOD OF DIAGNOSIS IN EMPYEMA WITH COPIOUS PURULENT EXPECTORATION.

It may be useful to investigate the grounds of diagnosis in cases like those detailed by Dr. Greene and myself, which presented some of the symptoms of pulmonary abscess and bronchitis; for it is evident, that without clear and distinct views on this subject, no useful conclusion can be arrived at, and our prognosis must be devoid of anything like certainty, or even probability.

* Op. cit. vol. i. p. 113.

† See Forbes's Translation of Laennec on Diseases of the Chest, 4th Ed. p. 406.

In the first case detailed by Dr. Greene, except the abundant purulent expectoration, "no sign of pulmonary abscess or fistulous communication with a bronchial tube could be discovered." In his second, the symptoms likely to lead to an erroneous diagnosis, were the following:—"On applying the stethoscope under the spinous process of the scapula, and towards the root of the lung, a loud gurgling sound was heard; the resonance of the voice, also, was so loud and clear in this situation, as to amount to imperfect pectoriloquy, while percussion yielded a very dull sound. All these phenomena were the more striking, as contrasted with the voice and respiration on the opposite side. These signs, combined with the profuse, purulent expectoration, led me to suspect that the pleuritic effusion might be complicated with some structural disease of the lung—probably with a pneumonic abscess."* In his third case, we find no symptoms which could lead us to suppose the existence of a pulmonary abscess, except the *copious purulent expectoration*. The lung of the unaffected side yielded a clear sound in every situation, and the respiratory murmur was in every part puerile, and free from rale.

So that we have now *six* cases of empyema, in all of which copious purulent expectoration formed a prominent symptom; in *four* of them there were *no physical signs whatever* to account for this phenomenon, *not even those of bronchitis*.† In one, we are told, a loud gurgling sound was heard towards the root of the lung; but it is not mentioned whether this sound was persistent, or, if remov-

* Dublin Medical Journal, vol. xvii. p. 275.

† I am not ignorant of the fact, that in some rare cases of phthisis, the constitutional symptoms may continue for a long time, before the slightest trace of the physical phenomena of the disease become manifest, owing, most probably, to the morbid processes being confined to the central parts of the lung. I have now seen many such cases, and have observed in some of them a *peculiarly fætid odour from the breath after coughing, and from the expectoration*. The diagnosis in these obscure cases rests upon the want of correspondence between the presence of all the symptoms of phthisis, and the total absence of the physical phenomena. We are not, however, in such cases, left long in doubt, for very soon the lesion becomes discoverable by auscultation and percussion.

able by a paroxysm of coughing ; there were also " imperfect pectoriloquy," and " a very dull sound." "Gurgling," " imperfect pectoriloquy," "and a very dull sound," are then the only physical signs likely to mislead the physician ; and in the present state of the science, and possessed as we are of the facts disclosed in Dr. Greene's paper, we do not anticipate much difficulty on these points. The gurgling was but a larger degree of the rale noticed in my second case, and would probably have been completely removed, or at least greatly modified, by coughing, followed by expectoration. The presence or absence of the " imperfect pectoriloquy," by itself, must be considered of no value whatever as a sign to be relied on, either for or against the existence of pulmonary abscess in any part of the lung, and, above all other situations, of least value at the root of the organ, for here there is naturally an increased resonance of the voice, which some term bronchophony, and others may, with as much reason, call imperfect pectoriloquy. The dulness of sound was caused either by the deposition of thick layers of lymph, the result of the previous pleuritic inflammation, or by a still existing effusion in the part—a condition by no means irreconcilable with the fact, that gurgling was heard over the seat of this dulness, for Andral distinctly states that an effusion of fluid between the lungs and the ribs does not prevent our hearing sounds generated in the bronchial tubes.*

The history of this case, the situation (the root of the lung) in which the phenomena occurred, and the paucity and valueless nature of the signs, could hardly mislead any one at the present time, particularly when we bear in mind that pneumonic abscess

* " When the bronchi are full of mucus, the interposition of a liquid between the lungs and the ribs does not prevent the different rales from being heard, to which the accumulation of this mucus may give rise. This remark is not devoid of importance, for the existence of these rales may incline one to think, that the lung is in immediate contact with the ribs, and consequently may occasion the disease to be mistaken."—*Clinique Medicale*, by Spillan, p. 603.

is one of the rarest lesions met with in the lungs,* and almost always occupies the base of the organ, whilst tubercular abscess is situated in the apex. The reason why pneumonic abscess so seldom occurs, has been accurately pointed out by Dr. Stokes;† and a moment's reflection will shew, that it is next to impossible an abscess of this nature could form at the *root* of the lung.

These circumstances, taken in conjunction with the fact, that *true pneumonic abscesses are not accompanied with very copious expectoration; but, on the contrary, are found to contain an exceedingly small quantity of pus‡*, will enable the observer to arrive at a correct diagnosis in a similar instance.

* "At the period when Laennec published his work on Auscultation, purulent collections were found but *five or six times* in the inflamed lung; they were yet very small. The *largest abscess met could scarcely admit the ends of the three fingers* joined together. As for ourselves, it has not fallen to our lot *more than once to see* a real abscess after a pneumonia, at the La Charité."—Andral's *Clinique Medicale*, by Spillan, p. 382.

He alludes to another example of abscess of the lung after pneumonia, presented to the Royal Academy of Medicine by M. Honoré. *These two appear to be the only cases Andral has met with.*—Op. cit. p. 382.

† "But it is in the anatomical structure of the lung that we find the true explanation of the point in question. If we compare the viscera, with respect to the liability to form abscess, we find that in those in which the earlier products of the inflammation can be got rid of, there is the least liability to abscess. In the brain, which has no excretory duct, abscess is a common result of inflammation; abscess of the liver is less common than that of the brain, and more so than that of the lung; abscess of the kidney may be placed next in the scale, and that of the lung decidedly the last in the order of frequency. Considering the bronchial tubes as excretory ducts, we must admit, that of all the viscera, the lungs have the most extensive apparatus for excretion, whether we consider it in a vital or mechanical point of view. From the first, the products of irritation are got rid of by expectoration; and even in the suppurative stage, the accumulation of the matter is prevented by the universal permeability of the lung."—Stokes on *Diseases of the Chest*, p. 313.

‡ "The rare instances, in which what may be regarded as abscess in the lung really takes place, occur when a portion of lung has been consolidated by inflammation, obliterating the air-cells. In such consolidated portions of the lung suppuration may take place, and produce a collection of pus having the character of

In one of the cases I have detailed, the bronchitic rales were diffused all over the sound lung, and yet no trace of inflammation could be detected at the *post mortem* examination; in the other, a few mucous rales were heard occasionally at the root of the lung, which disappeared after each fit of coughing, attended with purulent spitting, and were unaccompanied by any fever or distress of breathing which could legitimately be ascribed to bronchitis.

We are therefore warranted in deducing from the foregoing cases the following rule. *That purulent expectoration in empyema, though attended by quick pulse, sweating, emaciation, and other hectic symptoms, is not indicative of tubercular or pneumonic abscess, unless accompanied by unequivocal physical signs of these lesions; but, on the contrary, it is to be regarded as the consequence of an effort of the constitution to get rid of a large collection of purulent matter, by one of the ordinary emunctories.*

Since the above was written, Dr. Stokes has informed me of the particulars of two cases, in both of which there were extensive empyema of one side, and *copious purulent expectoration*, but without any of the usual signs of abscess or chronic bronchitis. These two cases, from a physician of such accurate observation, strengthen, in an essential degree, the position upon which the diagnosis, above announced, is grounded, and confirm the conclusions to which I have been led.

Andral also details the particulars of a case of empyema, in which, before death, *purulent* expectoration took place, "which seemed to come from a tuberculous mass;" but at the *post mortem* examination no cavity was detected in either lung, some *crude* tubercles were found in the upper portion of the right one. In his remarks on the case, he says, "we shall also

abscess. The pus so formed is neither *very pure nor very copious*. I do not know that I have seen above a drachm collected in such a cavity, and in most of the instances which I can call to mind, there was also present, gangrene of the lung, which had produced some slough or eschar."—Hodgkin's *Lectures on the Morbid Anatomy of the Serous and Mucous Membranes*, vol. ii. p. 5.

direct attention to the nature of the expectoration, similar to that yielded by *large tubercular cavities*, and which was merely the product of the bronchial mucous membrane." The mucous membrane presented *no trace of disease*.*

CONDITION OF THE SOUND LUNG IN EMPYEMA.

There is, however, a *true* bronchitis of the sound lung which occurs in empyema, where the lung of the affected side is so compressed and bound down by adhesions as to be unable to take any part in the respiratory process. In four cases which I have witnessed, the disease was ushered in by accession of fever and increased difficulty of breathing, and no satisfactory cause could be assigned, save *the additional duty imposed on one lung by the useless state of the other*. In these instances the expectoration was not purulent, nor did it differ in any respect from what usually attends acute bronchitis, and in all, the affection disappeared on an amendment taking place in the opposite side of the chest.

Such cases are not likely to be confounded with those in which the mucous and gurgling rales are produced by the quantities of pus in the tubes, the result of vicarious secretion. But there is also another condition of the sound lung in empyema, which, though it has escaped the notice of writers, it is necessary we should be familiar with, inasmuch as our overlooking it, or, on the other hand, attaching too much importance to it, will lead us into error, namely, *congestion* of the mucous membrane, *producing physical signs of bronchitis*, or some of the stethoscopic signs of pneumonia. This is by no means an unusual complication of empyema. I have observed it now in several instances, and have no doubt that many cases, presenting the physical signs denoting these conditions of the sound lung, have been recorded as examples of empyema of one side, with bronchitis or pneumonia of the opposite. A little attention will enable us to distinguish this state very readily from an

* Vide *Clinique Medicale*, by Spillan, p. 566.

acute bronchitis, or a pneumonia, supervening in the sound lung during the progress of the empyema, for though we may discover bronchitic rales all over the back part of the sound lung, in which the respiratory murmur had previously been puerile and free from rale; or we may often hear a loud, large, and loose crepitus (such as is commonly heard in *typhoid* pneumonia) yet we do not find the *dulness* on percussion, and characteristic sputa of pneumonia on the one hand, nor, on the other, the increase of fever, exacerbation of cough, or great difficulty of breathing which almost invariably accompany an accession of bronchial inflammation. On the contrary, neither the general symptoms, nor the feelings, nor the appearance of the patient indicate the supervention of a new disease. I am disposed, therefore, to attach very great importance to the absence of these latter symptoms as diagnostic signs between this affection of the lung and true bronchitis, for considerable experience and close observation of thoracic disease have convinced me of the truth of the doctrine long since advanced by my friend and respected preceptor, Dr. Stokes, that *these symptoms are a measure of the irritation, rather than of the obstruction in the lung.*

It is unnecessary to point out the errors in treatment and prognosis, into which a neglect of the means of distinguishing between these complications of empyema, will lead the practitioner; the patient will be harassed by cupping, blistering, and other local applications, and his apprehensions awakened, and the alarm of his friends excited, by the intelligence that his sound lung has become engaged, for we all know how fondly both patients and their friends look forward to a recovery so long as only one lung is diseased, and the error is not confined merely to those imperfectly acquainted with auscultation, it is daily committed by many, otherwise very familiar with the science.

There is no difficulty in accounting for congestion of the sound lung in empyema, if we reflect for a moment on the following circumstances, which I have long considered as quite

explanatory of the phenomenon. First. It occurs for the most part in those cases, where, from some unusual cause, the patient cannot lie on the affected side, but prefers reposing either on the sound side, on the back, or assumes the position termed by Andral *diagonal decubitus*, or, as more frequently happens, he lies altogether on the diseased side. In any of these situations, it is evident that congestion in particular parts of the lung is favoured by the position of the patient. Secondly. A still more important and efficient cause is owing to the circumstance *that in consequence of the compressed, collapsed, and impermeable condition of one lung, the whole quantity of the blood circulating through the body, is driven into the sound lung for aeration and oxygenation, and its sojourn in that lung is prolonged beyond the period which in health is necessary for the purification of only half the quantity; and, as a natural consequence, congestion from this cause depends on the greater or less degree of permeability enjoyed by the lung of the affected side.* The disappearance of this condition of the lung is one of the first symptoms which indicate the absorption of the pleuritic effusion, and proceeds in direct ratio with the gradually increasing expansibility of the compressed lung.

CONDITION OF THE LIVER IN EMPYEMA.

In connexion with this subject I may be permitted to allude to the condition of the liver in empyema. For the most ample and accurate observations we possess respecting that organ in the affection under consideration we are indebted to the researches of Dr. Stokes; but, besides the observations detailed in his celebrated work, there are many points worthy of attention, which have hitherto been left uninvestigated.

It is generally supposed that the only way in which the liver is engaged in this disease, occurs when an extensive empyema of the *right* side depresses it *mechanically*; its condition in empyema of the left side has been altogether overlooked. Some time ago I met with a case in which an effusion into the left

pleura, producing dislocation of the heart, was also attended with a perceptible tumour in the right hypochondriac and epigastric regions, which I concluded was an ordinary enlargement of the liver, and I was confirmed in this opinion when the tumour diminished under the use of mercury given for the pleurisy. I have since seen the same phenomenon in cases of empyema of the left side, in which no symptoms of derangement of the liver preceded the pleuritic attack, and in which the disappearance of the hepatic enlargement was *too sudden* and *too complete* to be confounded with the ordinary enlargement of the organ from chronic hepatitis. In some instances this enlargement is attended with pain on pressure; and this symptom has often led to the affection being considered as hepatitis. Now I have no doubt that besides mere *mechanical* depression of the liver, there is another agent of a vital nature, still more efficient in the production of the hepatic tumour, for were we to rest satisfied with the usual explanation, we should expect that the appearance of the hepatic tumour, only occurred in empyema of the right side, so extensive, as to produce not only depression of the liver, but likewise protrusion of the intercostal spaces of that side. But the fact is not so, it is not confined to effusions into the right pleura, but occurs likewise in cases where the left cavity is the seat of the disease, and many of those examples of empyema of the left side, in which tumours in the epigastrium and towards the umbilicus were noticed, and which were considered as depression and displacement of the spleen, were in all probability examples of this enlargement of the liver.* And on the other hand an hepatic tumour is frequently observed in cases where there is no protrusion of the intercostal spaces, although there exists considerable impediment to the respiration. Let us inquire into the nature of this *enlargement* of the organ, for such I have no doubt will be found to be the true nature of the alteration in

* See the works of Piorry and Raciborski. We need not be surprised at this, for I have often seen an enlarged left lobe of the liver mistaken for enlarged spleen, and *vice versa*.

many cases, though I am far from denying that in empyema of the right side, the viscus is also depressed mechanically by the fluid within the thorax. This increase in size, then, seems due to *a congestion or engorgement of the liver analogous to what takes place in cases of morbus cordis and diseases of the lungs, attended with imperfect aeration of the blood.* In these diseases it has long been known, that the liver takes on a supplementary action, by which a quantity of carbon is eliminated from the blood, which the impeded state of the circulation through the heart and lungs renders them unable to accomplish.* These enlargements are of very frequent occurrence in the class of cases I have mentioned, and every one must have been at times surprised, by their rapid disappearance as soon as the respiration was relieved, and the circulation through the heart and lungs became less obstructed. Morbid anatomy shows us that no material change in the structure of the organ takes place; it is found considerably enlarged, and always gorged with blood, which flows out in great profusion, on an incision being made into its substance, whose consistence is somewhat softer than natural, and darker in colour. But as this peculiar state of the liver does not invariably attend obstruction of the circulation, from morbus cordis or disease of the lungs, even when considerable; so likewise, it is not an invariable attendant on effusions into the pleura, but when the hepatic tumour *is* perceived, we must, I think, admit of the explanation now offered (in conjunction with mechanical depression, when the effusion occurs on the right side)—a view of the subject, not based on theory, but *grounded on the well-known physiological laws which regulate the combined functions of the heart, lungs, and liver.*†

* The researches of Tiedeman and Gmelin, as well as those of Elliotson and Liebig, have now clearly established the truth of the above doctrine.

† In the case of a gentleman, whom I attended along with my friend Mr. Newland, for morbus cordis and incipient phthisis, and who had been for many years affected with asthma; every paroxysm of the latter disease was attended with a remarkable enlargement of the liver, which used to protrude to midway between

Though this peculiar condition of the liver, and the view I take of the hepatic tumours occurring in empyema, have not been noticed by writers on diseases of the chest, yet, in their accounts of post mortem appearances, this state of the liver is frequently mentioned incidentally. Thus, in a paper published by Dr. Stokes many years ago, upon the diagnosis of empyema, he gives the case of a patient, in whom, besides the appearances of empyema of the right side, the liver was found "*nearly three times its natural size.*" As no other alteration is mentioned, we cannot suppose that any was observed, otherwise it would not have been omitted by a writer of such acknowledged accuracy.* And again, in his work on the Chest, we find him alluding to a case of empyema of the right side, in which the liver was *softened and engorged*.† Andral also remarks, in a casual manner, in his description of one of his fatal cases of empyema of the right side, that *the liver was found enlarged and gorged with blood*‡ and at the post mortem of my first case, "*the liver was enlarged to nearly half its normal size, engorged, and full of blood,*" though the empyema was on the *left* side; and had my attention at that time been directed to this subject, there can be no doubt that such an extensive enlargement would have been readily detected, and we should have had then, what I have since frequently seen, effusion into the left side of the chest, with the occurrence of a large hepatic tumour.

I could quote several other cases mentioned in different pe-

the ribs and umbilicus, and into the epigastric region. This enlargement generally subsided under leeching of the anus, and its disappearance was almost always attended with relief to the pectoral symptoms. I have observed the same thing to occur in many other cases, where the liver has become suddenly enlarged in morbus cordis. During the illness of the late Mr. Colles, the liver used to increase to nearly twice its natural size in twenty-four hours, during his paroxysms of dyspnœa, and used to disappear with equal rapidity, as soon as he obtained relief in his breathing.

* Op. cit. p. 503.

† Vide Dublin Medical Journal, vol. iii. p. 57.

‡ Vide Andral's Clinique Médicale, by Spillan, p. 515.

riodicals, where this enlargement of the liver from engorgement was found, at the examination of fatal cases of empyema. I am, therefore, confident that we are not justified in considering the hepatic tumour in these cases, as produced by a mechanical depression alone, for, according to the best observers, this depression is always either preceded or accompanied by a protrusion of the intercostal spaces, and the same explanation has been offered for the occurrence of the two symptoms. But in the case of cancer of the lung and empyema, published by Dr. Stokes, the liver was found much enlarged and engorged with blood, though for a long time previous to death, the right side had returned to its usual size, and all appearance of intercostal protrusion had long before disappeared. The enlargement, therefore, was the result of the same cause which produced the varicose condition of the veins, namely, the impediment to the free circulation through the lungs, whereby a supplementary duty was imposed upon the liver, and, as always occurs in such cases, the organ was found not only enlarged but engorged, and its texture much darker than natural, from its containing a larger quantity of blood.* It is, therefore, natural to expect that, as in chronic bronchitis, emphysema and phthisis, morbus cordis and cancer of the lungs the liver supplies the place of the inefficiency of the lungs in purifying the blood, that it will act in a similar manner when one of these organs is compressed and rendered useless, by an extensive pleuritic effusion into either side of the chest, and this is proved, not only by my observations in cases that have recovered, but also by the appearances revealed at necroscopic examinations of empyema, recorded by writers who had neither a theory to support, nor a series of observations requiring confirmation, and whose testimony is, therefore, entitled to the

* As in the account of the autopsy furnished to Dr. Stokes by Dr. Carroll of Waterford, it is merely stated that the liver was enlarged, I took the liberty of writing to that gentleman, to ascertain more accurately its precise condition, and the above account is extracted from the answer which he very kindly forwarded to me.

highest consideration. I shall now throw into the form of propositions, the points discussed in this paper.

1. That in Cases I., II. and III., we are presented with a new form of Empyema, which may be termed "Pulsating Empyema of Necessity," exhibiting some features common to that form of empyema and to thoracic aneurism, and encephaloid disease of the lung.

2. That it may be diagnosed from thoracic aneurism, by

- a. The history of the case.
- b. The dulness extending over the whole side, the pulsation being only felt in the external tumour.
- c. The absence of thrill.
- d. The absence of bruit de soufflet.
- e. The extent and nature of the fluctuation.

3. That it may be distinguished from encephaloid disease of the lung and mediastinum, by

- a. The absence of the expectoration resembling *black currant jelly*.
- b. The absence of a persistent bronchitis.
- c. The absence of a varicose condition of the veins and œdema of the side affected.
- d. In cancer of the lung the situation in which the external tumours form, is not invariably confined to the thorax.

4. That copious purulent expectoration in empyema is not always indicative of cavities in the lung; but, on the contrary, is of frequent occurrence in this disease, and seems to be the result of an effort of nature to get rid of the purulent collection by the nearest and readiest outlet.

5. That this symptom, when it results from the above cause, is not attended with the usual symptoms either of abscess of the lungs, or inflammation of the bronchial mucous membrane.

6. That a *true* bronchitis of the sound lung frequently complicates empyema.

7. That still more frequently the sound lung becomes congested, and presents some of the ordinary signs of bronchitis and pneumonia, from both of which it may be distinguished by attention to the rules laid down in the previous part of this communication.

8. That in addition to *depression* of the liver, from mechanical causes, that organ is likewise *enlarged from engorgement with blood* in empyema.

9. This enlargement is not confined to empyema of the right side, but occurs also when the disease is seated in the left cavity of the chest.

10. That this enlargement is identical with that which takes place in other affections of the lungs and heart, where, in consequence of their functions being impaired, an additional duty is imposed on the liver, viz., *that of eliminating carbon from the blood*, as proved by the researches of Tiedeman and Gmelin, Elliotson and Liebig; and as occurs in the former cases, so likewise we observe in this, that the increased size of the organ is due to an additional afflux of blood, whereby its structure becomes engorged, softer in consistence, and darker in colour.

11. This condition of the liver has been observed by myself as proved by dissection (see Case I.), and its presence detected in other cases that have recovered. It has also been mentioned by many writers in their accounts of the appearances noticed at the autopsies of cases of empyema, who have recorded the fact, though unaware of its connexion with the subject under discussion, and it must now be considered as constituting an additional feature in the diagnosis and pathology of empyema.

12. This condition of the liver, when it occurs in the ordinary diseases of the heart and lungs, has been observed to disappear as soon as the obstruction to the circulation of the blood and want of proper aeration, which gave rise to it, had ceased. So likewise in empyema, its disappearance is one of the first signs which indicate the removal of the effusion, and the return of the compressed lung to the performance of its functions.

I cannot conclude without availing myself of this opportunity of returning my thanks to Dr. Graves for his extreme kindness and liberality in permitting me to make use of the cases upon which the foregoing observations are founded.

10, *Lower Fitzwilliam Street.*

ART. II.—On impending *Dissolution and Nervous Affections in young Infants.* By RICHARD DOHERTY, M. D., Honorary Member and Secretary of the Dublin Obstetrical Society.

[Read before that Society, Dec. 4, 1843.]

THE risks to which children are exposed at birth admirably exemplify the three modes whereby, according to Professor Alison's able analyzation of the causes of sudden death, a period may be put to existence in after-life; namely, by Death commencing at the Brain, Death commencing at the Lungs, and Death commencing at the Heart.* And as, whilst each of these catastrophies is impending, a train of convulsive actions may be established in the adult, so in the child just born, these conditions may exist contemporaneously.

Death, commencing at the brain, may be induced in two ways; firstly, as in compression, when the respiratory function is the first to suffer; and secondly, as in concussion, when the heart's action is directly arrested. The first mode, or that by coma, is frequently a cause of children being still-born; and, as in individuals of a more advanced age labouring under apoplexy, there is venous turgescence, bloated features, slow and impeded respiration, so in the infant, which has so suffered, those peculiarities are observable. It is quite a common circumstance, for the face, when expelled, to assume a purple hue; which colour, if the labour be quickly finished, soon disappears: but if from delay or any other cause the return of the blood from the

* Outlines of Physiology and Pathology, by Wm. P. Alison, M. D. London, 1833. Page 326.