in Ireland shows that we have been aroused from the torpor of this dull and dreary period. The development of arrangements for practical work and the healthy insistence on compulsory laboratory and dissecting-room personal work on the part of the student; the increasing stimulus of practical examinations; and the influence of that active body of young men who have had the advantage of one or more sessions in foreign schools—all these influences combined have enabled us to rise by degrees from the degradation into which the Anatomical and Physiological School of Dublin had sunk; and now *per varios casus, per tot discrimina rerum*, the Dublin School is in a position to give to its students a genuine training in the two leading branches of biology—morphology and physiology. Every stage of progress has its own danger, and while that which formerly beset the School in its best days was a tendency to regard anatomy too exclusively as solely important from its relation to operative surgery, the present-day danger in the opposite swing of the pendulum of opinion is the fear of our teaching being too theoretic or scientific, and paying too little regard to its more direct practical bearing. The middle course is that of true utility, and is the only way to render anatomy really interesting.

Much yet remains to be done even in dissecting-room anatomy, still more in histology, comparative anatomy, embryology, and pure physiology; and in the search after new facts and reliable deductions we have the encouragement given long ago by Steno—*"Pulchra quæ videntur, pulchriora quæ sciuntur, longe pulcherrima quæ ignorantur."*

ART. II.—*Gangrene of the Lung, in which the Cavity was Tapped.*

By J. MAGEE FINNY, M.D., Dubl.; F.K.Q.C.P.I.; King's Professor of Practice of Medicine; Physician to Sir Patrick Dun's Hospital.

GANGRENE of the lung is a disease of great rarity. It consists in the death of the lung-tissue associated with putrefaction owing to the admission of air. It may be either *circumscribed*, the size of a filbert or hazel-nut, or it may be *diffused* through a considerable portion of one lobe, causing a cavity large enough to receive an orange or even the human hand.

It may appear as an idiopathic or primary affection, though more commonly it develops itself consecutively during the progress

of some other lung disease, the most common being pneumonia occurring in the decrepid or in drunkards. In such cases possibly two factors are at work to produce it—(1) the hindrance to the circulation by the pressure exerted on the capillaries of the lung by the inflammatory exudation, and (2) the already defective and impoverished condition of the blood. Embolism of the pulmonary or bronchial arteries, hæmorrhagic infarction and putrid infection in the neighbourhood of the lung, foreign bodies in the air passages, decomposition by means of chemical agents, and traumatic influences, have all been noted to precede, induce, or accompany gangrene. It is, however, usually the circumscribed form of Laennec which is thus noted. Diffuse gangrene is very much rarer and its ætiology much more obscure. Hertz states it attacks by preference the upper lobe. Hope states that Laennec had seen but two cases of diffuse gangrene from all causes, Andral but one, and Hope but one.

It has fallen to my lot to have met with three cases of diffuse and one of circumscribed gangrene of the lung in hospital practice. All these cases occurred in the years 1882–83. Of the diffused varieties two occupied the lower lobes, right and left respectively, and one the left upper lobe primarily, and secondarily the left lower lobe and the right middle lobe. All the cases were in male patients ranging in age from twenty-two to forty-seven. Full particulars of the two cases of 1882 are given in the “Proceedings of the Pathological Society of Dublin,” 1882, Vol. IX., pp. 105–108.

These cases impressed me forcibly with the uncertainty and obscurity which enshrouds the subject of the ætiology of the disease, the difficulties of accurate diagnosis of the exact locality, size, and shape of the gangrenous cavity, and as to whether it is entirely pulmonic or partly pleural as well, and of the small practical advances medical science has made towards its alleviation or cure.

Within the last three years, in a very limited number of instances of abscesses in the lungs (fœtid or gangrenous), physicians have been led to advise incision and tapping of the lungs, and surgeons have been courageous enough to act on that advice, and to give by operative proceedings through the chest wall a freer exit to the pent-up fœtid pus and the lumpy rotten matter than existed through the smaller bronchi; and in a case of gangrenous pleurisy reported by Wagner (*Berliner klinische Wochenschrift*, September 6, 1880, p. 511) a piece of gangrenous lung-tissue, 7 cm. long and 3 cm.

broad, was removed through the incision of the chest wall, when the fœtor immediately stopped and the patient recovered.

The last case of diffuse gangrene of the lungs came under my care last November, and I now bring it forward as a contribution towards the subject of gangrene of the lung. So far as I have been able to discover it is also the second instance in which incision and tapping of the gangrenous cavity was resorted to as a means of treatment. For this reason I desire it to be looked upon as a contribution to the practical literature of the subject, and in no way as laying down dogmatic rules for the management of such abscesses. Be the issue what it may of any new and untried line of treatment—which has been based on sound principle and honestly carried out—be it successful or the reverse in any given instance, it is our duty as humanitarian physicians to record such issues in all honest faith, and in the hope that when sufficient data are accumulated and experience is acquired, a sound reliable opinion may be formed of the utility or inutility of such treatment as a means of alleviation or of cure.

However much at the first blush one might be disposed to be biassed in favour of or against attempting to evacuate externally the contents of a pulmonary cavity, according as the cases in which methods with such an aim have been adopted be successful or non-successful, I feel sure that in suspending one's judgment—while waiting for further light—the best possible help is being given towards placing the treatment of gangrenous cavities upon a sound and scientific basis. For this end, owing to the rarity of such cases, and the still greater rarity of cases in which incision has been or will be practised, one must be prepared to wait much longer than in perhaps any other case where operative proceedings are *sub judice* as a method of treatment.

As bearing upon the rarity of gangrene of the lung, it may be interesting to note that from the years 1847 to 1882, inclusive, the "Proceedings of the London Pathological Society" contain but ten instances of gangrene of the lungs recorded in the thirty-two volumes, and many of these are of the circumscribed variety.

CASE I.*—*Left Pleurisy—chiefly Diaphragmatic ; Pneumonia of Lower Lobe of Left Lung ; Gangrenous Cavity in Lower part of Upper Lobe ; Secondary Right Pleurisy, and Secondary Circumscribed Gangrene of Middle Lobe of Right Lung ; Exploratory Punctures ; Incision below Inferior Angle of Left Scapula ; Drainage Tube Inserted ; Cessation of Fœtor of Breath and*

* From daily notes taken by Mr. Robert M'Adam, clinical clerk.

Expectoration ; Gangrenous Emphysema of Skin ; Death by Adynamia.—Michael H., aged thirty, labourer, was admitted to Sir Patrick Dun's Hospital under my care on November 3rd, 1883, on the order of my surgical colleague, Dr. Charles B. Ball, who had seen him at his own house, and who had described his case to have been one of the most severe forms of acute left pleurisy, with much more pain than is usual. In the beginning the pain was chiefly referred to the left hypochondric and left epigastric regions, and needed large opiates to ease it. There was not much fever, and but little cough, without expectoration, at any time he had visited the patient. The friction of pleurisy was extremely well marked, and when sent to hospital there was evidence of moderate effusion.

The appearance of the man on admission was little altered from that of a fairly robust healthy young man, and very different from what a preconceived idea of gangrene of the lungs would picture ; and his history was in accordance with his looks. His habits, though not steady, were not those of intemperance, and his usual drink was porter. There was no history of syphilis, nor of any previous debility or of constitutional ill health, nor was he engaged in any trade, nor exposed to any circumstances to which the disease could be attributed. He states his present illness was due to a severe wetting three weeks before admission to hospital, and began a couple of days after by shivering fits. These attacks lasted, with intervals, for two or three days. Nearly a week elapsed before he felt any considerable pain, which then attacked him low down on his left side in the mid-axillary line. The pain was most acute, and was aggravated by every effort of respiration ; so that he thought he should have been suffocated had it not been for the relief Dr. Ball was able to give him. The pain was still present, but to a very much less degree, when admitted, and referred to the region of the left nipple, as well as to that of the hypochondrium ; and at the former a slight friction sound was audible the next day. There was little or no cough, and no expectoration until he had been seven days in hospital. During this period, which preceded the gangrene, as a calm before a storm, the pulse—excluding the night of the day of admission—was 90 in the evening and 84–78 in the morning. It was not a strong pulse, and tallied rather with the description given by Dr. Anstie of the pulse in pleurisy of over a week's duration, as being soft and compressible. The temperature was 100° for three consecutive mornings, but rose to 102·5°–103° the first three evenings, to 101·4° on the 4th, 102·4° on the 5th and 6th, and 103° again on the 7th. There were, however, no night sweats, and though the respirations were unduly fast in proportion to the rate of the pulse (1 to 3), there was no “*besoin de respirer*,” nor were the *alæ nasi* working. It was, therefore, attributed to the pleuritic pain, which prevented deep respiration. The tongue was indented, and coated with thick

white fur; decubitus dorsal, and towards left side; change of posture to the right caused uneasiness and pain in the left side in the situations described; but the patient was able to move himself readily, and to undergo a physical examination on November 5th, both lying down and sitting up. The following was the note made at that date:—The left side, at its lower part, did not move during respiration as freely as the right; it appeared slightly bulged, and from below up to the level of the sixth rib, in the anterior axillary line, there was dulness on percussion. The line of dulness changed a little—but still a little—on change of posture; and, as is usual in pleurisy, with moderate effusion, or in encysted pleurisy, the upper limit was not horizontal, but followed the slope upwards of the sixth intercostal space from before backwards. Over this area there was an absence of vocal fremitus and respiratory sounds, while above it and on the opposite side both these signs existed. The impulse of the heart was felt a little nearer the sternum than normal, showing the displacement of the organ to be slight. The urine was examined then and on several subsequent occasions, and was seemingly normal in quantity, specific gravity, reaction, and in being free from albumen.

The diagnosis made on the 5th November was “limited pleurisy, with effusion, with probably a thickened pleura.” At the same time I took the precaution to point out to the class who were present, and to my clinical clerks, the importance of the high evening range of fever as a signal of danger, and suggested the possibility of the occurrence of either pneumonia in the lower lobe, or a purulent change in the pleural contents. The treatment was chiefly symptomatic, and consisted of milk and beef tea dietary, with aperient pills, and a vegetable bitter mixture; while large poultices to the side were agreeable to the patient’s sensations. He slept well without narcotics, and seemed going on well till November 9th, the seventh day in hospital, when he was noticed to have a flush on his right cheek, and to look feverish and badly. He now coughed a great deal, without much expectoration, though one or two sputa were viscid and rust-coloured; the usual morning remission of fever did not take place, and by the evening it reached 103° , while, at the same time, the respirations ranged 56, and the pulse 100.

There was no doubt now of a pneumonic complication in some deep part of the lobe, in spite of the absence of the auscultatory signs proper to the disease, and notwithstanding the presence of the signs already described on the 5th, which remained quite unaltered. I was not, however, prepared for the unmistakable nature of the pulmonary complication which the following twelve hours revealed.

During the thirty-six hours of the 9th and 10th November, he suffered from constant distressing cough, so that sleep was absent for two nights, and rapid exhaustion was induced. On the night of the 10th he

suddenly became alarmingly ill, and coughed up over half a pint of extremely foetid greenish gray sputa, each cough bringing up a mouthful of this abominably stinking material. He now fell into almost a state of collapse, and on the morning of the 11th the patient's appearance for an hour or two was most alarming, as there was cyanosis of the extremities, and a brown-red lividity of the face and forehead and temples. His respirations rose to 62 in the minute, while the heart beat but 90, and the first sound was absent over the base of the heart. Under free stimulation by a mixture of carb. ammon., ætheris Hoffmanni, tinct. belladonnæ, and ol. terebinthin., and by egg flip, he rallied, and in a couple of days all signs of immediate danger passed away, and the fever settled down to a remittent type of a mild degree for a week— 101° at night, and 99.4° in the morning—and the respirations came down to about 42, and the pulse stood generally at 100.

The treatment was quinine, stimulants, and the vapour of carbolic acid, and oil of eucalyptus through an inhaler. The oil of eucalyptus was by experience proved to be the best deoderant for the bed and the spitting-cup. It did not, however, prevent an occasional stench of an overwhelming character, proceeding from the patient's breath, and this aggravation of the smell nearly always followed a day in which he did not cough up the usual amount. For the first two or three days the quantity coughed up was about half a pint, and afterwards one-third. The sputum was examined microscopically by Mr. M'Adam and myself after he had prepared it according to Fenwick's method, by boiling the "output" of twenty-four hours with dilute liq. potassæ. No elastic or other pulmonary tissue was discovered, but a great quantity of yellow granular masses and small oil globules and *débris*. Traube remarks that the absence of elastic tissue is the rule in microscopic examinations of gangrene of the lung.

During the ten days subsequent to the discharge of the gangrenous sputa he rapidly emaciated, while his digestion was quite disordered by the smell and presence of the sputa, some of which involuntarily were swallowed, so that the tongue became coated with a thick yellow fur; there was complete anorexia, and attacks of diarrhœa were induced. The physical examination of the chest showed the presence of metallic tinkling at the level of the fifth rib in the axilla the day following the first discharge of the broken-down lung tissue, and a tympanitic note could be elicited over a small area in the anterior axillary region the next day, while the lower part of the side was dull and airless.

Day by day the signs of a large cavity became more marked—amphoric respiration, metallic tinkling, and, when there had not been much coughing, a splashing sound could be detected on succussion.

On 16th I asked my colleagues to consult with me on the advisability of tapping the gangrenous cavity, which was now known to exist, and

which extended from the region of the normal apex beat back to the interscapular line at the fifth and sixth ribs. There was doubt as to the cavity being wholly pulmonic or partly pleural and partly pulmonic. It was decided by the majority of my colleagues that incision of the lung should not be undertaken; that it would be premature to think of such a course until the cavity could be made out by exploratory puncture with an aspirator-needle; but as the symptoms were not urgent, and the cavity seemed to be thoroughly evacuated by the bronchial tubes, Dr. Bennett postponed operating for five days. Another reason for delay was the occurrence of a dry pleurisy of the right, or previously healthy, side, which took place on this day (16th). This pleurisy was chiefly of the dry nature. It began in front, above the liver, and extended upwards and backwards, and was readily marked out by the friction. It then became arrested, and was followed by moderate congestion, causing dulness for two to three inches, and afterwards of a soft, moist crepitus over the lower part behind. These indications strongly suggested the occurrence of pleuro-pneumonia, due to the secondary poisoning of the opposite lung, and the possibility of its ending in circumscribed gangrene.

On 21st Professor Bennett, with the assistance of Dr. Ball, inserted the aspirator-needle in the mid-axillary line, above the seventh rib, and passed it in till its point seemed to lie in the lung as it received a movement at each act of respiration. The results were completely negative as regards withdrawing any fluid and transmitting any bad air. No bad results followed to the patient. The point for exploration was not that where the amphoric respiration indicated the close presence of the cavity, but it was feared to introduce the needle in a region where the heart's impulse was most distinctly palpable—that is, just below and outside the left nipple.

On 24th I made an exploratory puncture with a hypodermic needle over the middle of what seemed to be the chief cavity—that is, the upper border of sixth rib, near the angle of the scapula, and I withdrew a couple of drops of gray, very foetid matter. I was induced to do so, as the poor man for the last three days was rapidly wasting and becoming very weak, and his powers of expelling the rotten lung tissue were failing, and it occurred to me that, late though it was to give free vent to the contents of the cavity—for had I not been over-persuaded I would have attempted the operation of tapping the cavity ten days before—it was a *dernier ressort* which it would have been wrong to have refused the patient, in the hope that, were the retained and pent-up foetid matters no longer a direct source of infection, his digestive powers might regain sufficient vigour for assimilation. Accordingly, at 4 p.m. (Dr. Chute, our house surgeon, rendering all assistance), Dr. Bennett cut down upon the seventh intercostal space, hoping to reach the bottom of the cavity my exploratory puncture had struck, and thereby to obtain

better drainage; at the same time he avoided the end of the scapula, which might have traversed and interfered with the line of incision. The intercostal space was next opened by the knife and finger, and the pleural cavity was reached. A large trocar was then inserted, and on its withdrawal a small quantity of fœtid flaky curds, partly stained with blood, were forcibly ejected, while, with each act of respiration, the air whistled in and out. It was evident a cavity had been successfully opened, though I was disappointed at the quantity which escaped through the opening, knowing as I did the large size of the cavity I had mapped out. A full-sized rubber drainage tube was then passed through the canula and fixed, and the latter withdrawn, and the wound was covered with a thick coating of wadding, rendered aseptic by corrosive sublimate.

The operation was performed as the patient sat forward, was well borne, and accompanied by no undue coughing. There were but two sputa, of a sanguinolent colour, coughed up; and, in fact, there was no more expectoration afterwards, and the cough became much less distressing. A quiet night was obtained by a grain of opium, given every fourth hour. As the whistling noise was not heard through the dressing, over the tube, it was examined twenty-four hours after the operation, and found closed. It was cleared by means of a probe. A large portion of the dressing was saturated for several inches with discharge. The dressing was changed. It was, however, noticed that the fœtor had greatly disappeared.

The patient's ordinary position was on his back, and towards the left side, and, as he had hardly moved from the time of introducing the tube, the latter became bent, and the putrid matter had passed outside it. A new complication, however, was thereby induced, for some of the gangrenous fluid must have infiltrated the cellular tissue of the skin. The result of this was an extensive surgical emphysema. It extended downwards at first towards the abdomen, giving rise to a fallacious idea of flatulence on percussion, and it afterwards passed up to the axilla and pectorals on the left side. The air was chiefly over the left side, and could be easily pushed before the finger or hand. In several spots a small puncture was followed by a whistle of escaping air, which was free from all fœtid odour. Things went now from bad to worse, and the patient sank on the 26th, in the afternoon.

The *post mortem* examination was made sixteen hours afterwards.

The gangrenous emphysema of the skin extended from the thorax to the left scrotum, and on removing the skin and muscles, so as to expose the thorax freely, the muscles of the thorax, front and back, were converted into gangrenous matter of a yellow-green colour, and broke down under the finger. No trace, except on the skin, either outside or inside the thorax, of the exploratory puncture made on 23rd, could be detected;

but it was plain that it was too low down to touch the chief gangrenous cavity, which was found to occupy the lower part of the upper lobe of the lung, and to extend from the anterior thin portion between the heart and the fifth rib, backwards to the fifth and sixth ribs, near their angles. The lung was adherent to the fifth intercostal space and the sixth rib, in the anterior axillary line, and in separating it a small rupture took place, as these tissues seemed to form the outer wall of the cavity. The gangrene was diffused.

Hope's description of the lung tallies so exactly with that of the specimen I describe, that I shall give his words:—"The lobe in diffuse gangrene is surrounded by the third degree of pneumonia—in part it blends insensibly with purulent hepatisation, in parts it forms an imperfect shelvy cyst surrounding an excavation; the pulmonary tissue is extensively softened, so that at any part the finger pierces with facility through to the pleura; in the centre it is resolved into a putrilaginous pulp, consisting partly of a thin, brownish-black fluid, which accumulates in all the depressions, and partly of shreds and fragments of cellular tissue from which the fluid has strained, and which may, in some parts, be drawn into irregular bands. The colour varies from yellowish-brown to brown-black, deep muddy green, and dim dirty red, promiscuously intermingled. The gangrenous odour is insupportable."

The lower lobe was quite out of sight, and contracted into a small wedge-shaped reddish mass, intimately adherent to the diaphragm below by the thickened lymph exudation. Passing back from it was seen the rubber tube, which had thus evacuated a small cavity (size of a small apple), and missed the larger chamber, a couple of inches above. Its whole substance was in the third stage of pneumonia, and broke down in the fingers on removing it. The lower part of the pleural cavity contained some gangrenous flakes and fluid, and was completely bridged across by firm bands of recent lymph, stretching from the diaphragm to the sixth and seventh ribs, towards the axilla.

There was thus every confirmatory evidence of a primary left pleurisy, a collapsed lower lobe, bound down by adhesions, undergoing the last stage of pneumonia and becoming gangrenous, and a gangrenous cavity of wide dimensions in the region mapped out.

Interest attached to the examination of the right lung, and a recent but dry pleurisy was found over the lower two-thirds. The middle lobe was in a state of gangrenous inflammation, and was

CHART OF TEMPERATURE, PULSE, RESPIRATIONS, &c.
Name, Mike H.; Age, 30; Disease, Gangrene of Lung; Result, Death.

adherent to the diaphragm in one spot, and this was found to be due to a circumscribed gangrene, the size of a small orange, the lower wall of which was the diaphragm, and into which muscle the gangrenous discoloration could be traced. The abdominal surface was, however, quite free from disease.

No structural alteration was noticed in any other organ.

Remarks.—The failure which attended our endeavours to prolong the patient's life, and, if possible, by removing the centres of auto-infection, to give him a chance of life, was, I believe, attributable to the following three causes:—1st, the operation was delayed too long; 2nd, it was too low; and 3rd, there were more gangrenous cavities than could be discovered.

Should such a case come again under my care or seek my advice, I should be disposed to recommend that the operation of tapping the cavity should be attempted *as soon* as ever a cavity could be satisfactorily made out, and that the exploratory puncture should be made in the spot where the most prominent or evident physical signs of the cavity existed, and where the cavity approached the chest wall. A similar remark as to the position of tapping cavities in the lung and as to the advisability of not performing it too low is made by Messrs. Douglas Powell and W. R. Lyell (*British Medical Journal*, June 9, 1880). In their case the trocar was introduced in the eighth space in the mid-scapular line, and a small quantity of matter came through the canula and drainage-tube. The immediate results were great relief to the patient's cough and a cessation of expectoration, showing how much of these symptoms may be and probably is due to the irritation of the retained morbid matter rather than to its quantity. After death, which occurred fifty days after the operation, the lower lobe was found to be made up of a number of intercommunicating cavities, and the smallest of these and the lowest was that which was tapped, the part entered not being more than one-eighth inch above the diaphragm.

The only instance, as far as I can find, of a case of pulmonary gangrene having been treated by operative proceedings is that described by Mr. Solomon Charles Smith, the Surgeon to Halifax Infirmary, England, in the *Lancet*, Vol. I., 1880, p. 86, and to it I will shortly refer. The patient was an elderly man (aged sixty), who, after a week's illness with pneumonia of the middle lobe of the right lung, suddenly developed the symptoms of gangrene of the lung, coughing up half a pint of fœtid matter, and was soon

brought to death's door. After a rally he continued to expectorate 4-6 oz. of the gangrenous material, but when the expectoration was stopped extreme adynamia set in. As the evidence of a cavity of the middle lobe were sufficiently pronounced it was decided to give the patient a chance of life, of which, were he not operated on, he seemed to have little hold. An aspirator-needle was inserted at a point near the angle of the scapula, and through it very foetid air escaped. Using the canula as a director, the knife was carried in between the ribs and by its side a dressing forceps was introduced, and the wound sufficiently dilated to admit a drainage-tube. For a week free discharge of foetid fluid escaped, and expectoration and foetor of breath was greatly diminished. The cavity was washed out daily by carbolic acid irrigation. The patient seemed much more comfortable and enjoyed his food. However, the discharge began to be diminished on the eighth day, and the fever rose again, the wound assumed a gangrenous appearance, and the patient died seemingly of cardiac failure four days later. Unfortunately there was no necropsy.

Mr. Smith's statements from a personal review of his case are fairly put. He says—"I think, then, that although many observations are required before the indications for the operation of incision in gangrene of the lung can be laid down, it is probable that the following will be found a fair tentative proposition:—That when (1) the opening through the bronchi seems to be inefficient as an exit for the fluid, or the passage of the gangrenous ichor seems to be setting up irritation in the bronchial mucous membrane, (2) the patient's appearing to sink rather than to rally, and (3) auscultatory evidence of a cavity can be heard, an incision with a view to drainage is justifiable."

Drs. Fenger and Hollister, of Chicago, have collated six cases of opening and drainage of cavities in the lungs (*American Journal of the Medical Sciences*, Vol. 82, p. 370, 1881). Case I.—The first was, in 1878, performed by Radek for a supposed empyema, but which proved to be an abscess of the lung. Case II.—The second was a large abscess in the lower lobe of the left lung with foetid expectoration. Incision was made by Dr. Sutton, Pittsburg, in March, 1881, in the sixth intercostal space, with drainage and washing out with carbolised water. Great improvement took place and lasted for nearly two months, the patient being up and about for twenty-six days and on a fair way to recovery, when he died suddenly. The abscess was in the lung, the two pleuræ being

glued together. Case III. is one reported by Drs. Douglas Powell and R. W. Lyell in the *Lancet*, Vol. II., 1880, p. 12, to which reference has been already made, of multiple fœtid abscesses of the lower lobe of the right lung subsequent to bronchitis and pleuropneumonia. Incision was made in the eighth space, but owing probably to insufficient drainage a return of the fœtor occurred, pleuropneumonia of the opposite lung ensued, and death took place fifty days after the operation—a result which might have been averted had the incision been made at a higher level. Case IV.—Dr. Williams tapped a bronchiectatic cavity twice with an aspirator-needle. Each cough was followed by a rush of air under the skin, and though the air had a very fœtid odour it did no real or permanent harm. It may be worth while to allude to the fact that cutaneous emphysema has been known to occur in cases of pulmonary cavities without surgical interference, and Dr. G. Galli describes such an occurrence in the case of a phthisical girl, aged seventeen, who had an extensive cavity at the apex of the right lung (*London Medical Record*, Vol. V., 1877, p. 493). One day the fever increased, pain was referred to top of the chest, and emphysema was noticed, and which spread to the whole right side of chest, neck, and face. The air was found to have passed through the third intercostal space, as the pleural cavity was obliterated, and the ribs limited the lung cavity. Case V. is that to which I have referred at length above as being similar to mine, described by Mr. S. Smith; and Case VI., in 1880, is a very fully-described and carefully reasoned-out instance of fœtid abscess of the right lung (middle lobe), the result of suppuration of a large hydatid cyst. Drs. Fenger and Hollister made first an exploratory aspiration, and then incised the thorax in the third intercostal space $2\frac{1}{2}$ inches to the right of the sternum. A digital exploration of the cavity was made and a counter-opening in the fifth space in the axilla. A large drainage rubber-tube was inserted, the cavity washed out with weak carbolised water, and finally a perfect recovery took place after some 8–10 weeks.

I have not been able to find references to any more recent cases than these I have detailed, but sufficient has been advanced, I believe, to warrant the following propositions:—

1. That the primary indication in cases of extensive gangrenous cavities is to prevent the putrid matter becoming a centre of infection, and thereby not only poisoning the whole system, but by its direct contact (*a*) causing an extension of the gangrene in the

neighbouring tissue of the lung, or (b) by being sucked into the bronchi of the other lung or other lobes of the same lung, inducing a gangrenous broncho-pneumonia. In the words of Hertz (Ziemssen's *Cyclop.*, Vol. V., p. 431), "the *indicatio morbi* also imperatively demands the evacuation of the sputa out of the cavity," and in connexion with this I may mention that inversion of the patient's body, as in drowning, has been suggested.

2. That in cases of diffuse gangrene the probability of recovery is extremely small. Indeed, according to most observers diffuse gangrene from its nature runs an inevitably fatal course, and that therefore to attempt to cure such cases by antiseptics taken internally, such as tinct. eucalyptis in 6-8 grm. doses a day (as advocated by M. Reynaud in the *London Medical Record*, Vol. VIII., 1880, p. 229), or by inhalations of carbolic acid, turpentine, &c., is but to dally with the disease and to give it greater head.

3. That under these circumstances it is a justifiable proceeding, if not the right treatment, to provide means of evacuating the cavity of its rotten and putrefying contents through the skin.

4. That the operation of incision and tapping of basic cavities in the lung is one which has been successfully performed with immediate benefit, and that when death has occurred in cases so operated on, death has not been directly due to the operation, but rather to its not having been thorough and efficient enough.

5. That in cases of diffuse gangrene of the middle or upper lobes, operative proceedings are quite as urgently, if not more urgently, called for as when it is of the lower lobe, since from the natural gravitation from the upper to the lower lobe there is greater risk of secondary infection of the dependent part.

6. That exploratory puncture and aspiration should be first attempted, and should the cavity be reached immediate steps be taken for incision and tapping.

7. That the incision should be over the centre of the cavity, as well as can be accurately determined, and wherever it approaches nearest to the chest wall, and it may thus occupy the anterior as well as the posterior wall of the chest.

8. That the question as to the mode of operation is one at present upon which opinions differ, though it seems to me advisable that an incision should be made only down to the intercostal muscles, and that afterwards a trocar and canula should be passed into the lung to a depth of 3-4 inches, and that a drainage-tube of sufficient size should be substituted for the canula.

As to the nature of the drainage-tube most prefer the soft india-rubber, but Lyell advocates a silver tube, and Erichsen a flat vulcanite trocar and canula.

ART. III.—*The Antagonism of Drugs.** By WALTER G. SMITH, M.D.; King's Professor of Materia Medica in the School of Physic in Ireland; Physician to Sir Patrick Dun's Hospital.

THE subject which I wish to bring before you on the present occasion is the antagonism of drugs. Although some crude notions of antagonism must almost necessarily have arisen as soon as men began to compare the action of different remedies, and to observe that—*e.g.*, some acted as depressants, others as excitants, yet it is truly one of the most recent branches of pharmacology (*i.e.*, the science of the action of remedies), and that it must needs be so is easily seen. In the first place, exact investigations into the actions of drugs were in many cases scarcely possible until chemistry placed at our command the active principles of drugs in an isolated and pure condition; for experimentation with crude drugs—*e.g.*, opium and cinchona, each of which contains several well-defined active principles—would be waste of time. Again, such inquiries could not be fruitfully prosecuted until the methods of modern physiology were available, whereby we can track out the paths which a drug follows after its entry into the system, and fix upon the special functions or organs which come under its influence; for ever since the brilliant labours of Magendie, in the beginning of this century, localisation of action is the fundamental note of pharmacology, even as localisation of function in definite areas is the goal aimed at in the domain of nervous pathology.

Let me now endeavour to state clearly the questions which we shall attempt to answer:—

1. What is meant by antagonism?
2. Does reciprocal antagonism between drugs exist, and, if so, to what extent?
3. What practical consequences follow—*i.e.*, how much can be done in a given case by the method of counteraction?

First, as to the term itself. Some confusion exists as to the signification of the words antidotes and antagonists, the latter being the more modern word. Galen called all remedies given

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