Cancerous and other intra-thoracic growths : their natural history and diagnosis being the substance of the Lumleian lectures delivered before the Royal College of Physicians of London / by James Risdon Bennett.

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THEIR NATURAL HISTORY AND DIAGNOSIS:

BEING THE SUBSTANCE OF THE

LUMLEIAN LECTURES

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON

BY

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WITH FIVE PLATES.

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TO

THE PRESIDENT

AND

FELLOWS

OF THE

ROYAL COLLEGE OF PHYSICIANS OF LONDON

THESE PAGES ARE INSCRIBED

WITH SENTIMENTS

OF THE

HIGHEST RESPECT AND ESTEEM.

PREFACE.

The following pages make no pretence to be anything more than a contribution to the clinical history of the diseases of which they treat. They are some of the fruits gathered in a wide and rich field, for the observation of diseases of the chest, in which it has been my privilege to labour, and comprise the substance of the Lumleian Lectures which I had the honour of delivering before the Royal College of Physicians. In the opinion of many who did me the favour of listening to the lectures, it was deemed desirable that the facts here recorded should be made available for the profession at large; and I, therefore, submit them in this form to my fellow labourers. Deeply conscious as I am that the lectures

themselves fell far short of the high standard maintained by many who have preceded me in the chair once filled by the illustrious Harvey, I would fain hope that as now published they may be found not altogether unworthy either of the consideration of the College, or of a place in the records of practical medicine.

15, Finsbury Square, London;
November, 1871.

DESCRIPTION OF THE PLATES.

PLATE I

Represents the fibro-cancerous lung in Case IV, described at p. 36 *et seq.*

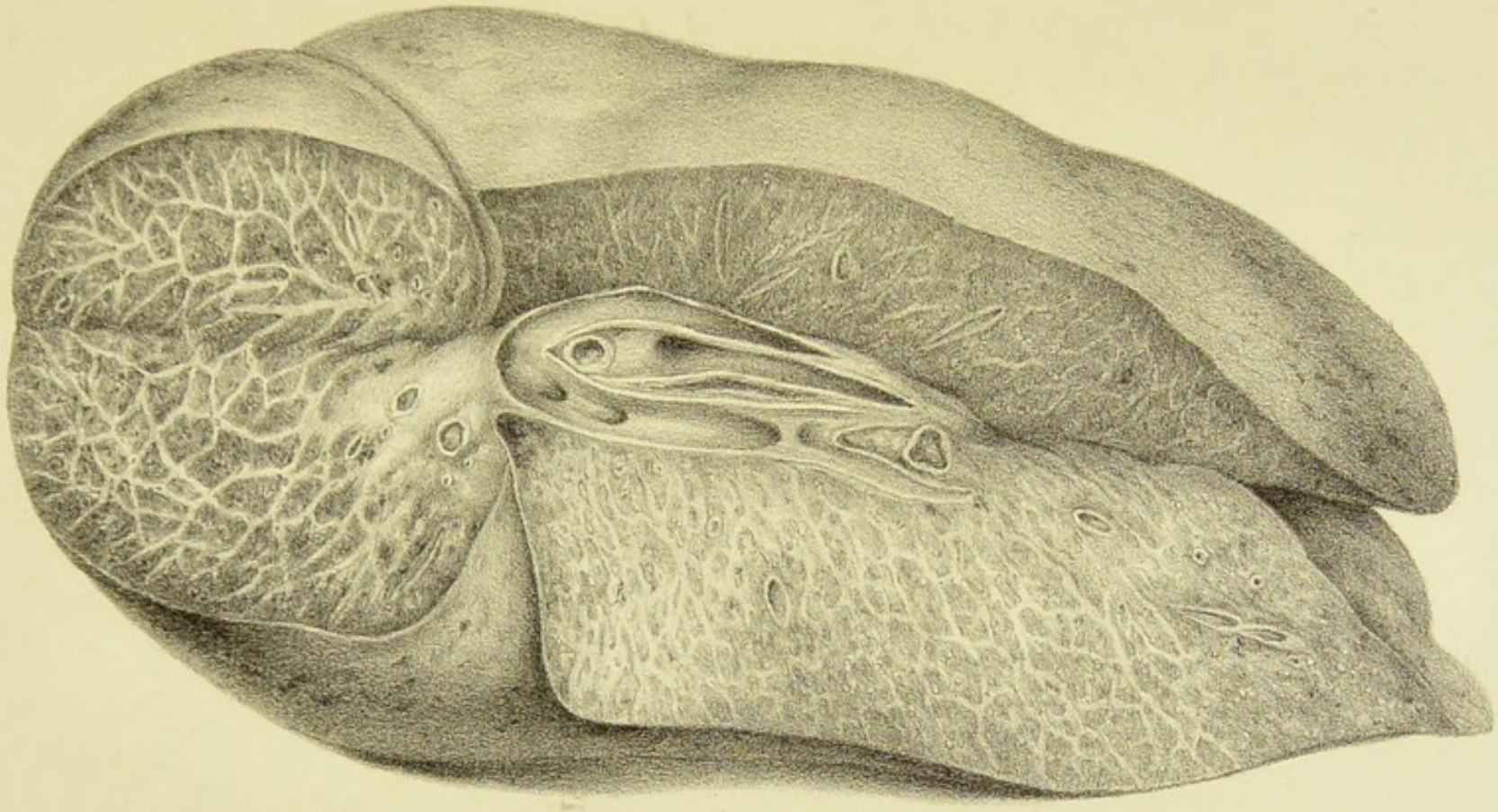
The lung has been cut through longitudinally to show the reticulated aspect given by the fibro-scirrhous deposit along the course of the tubes and inter-cellular spaces. The whitish-gray spots, resembling at first sight tubercle, but which are merely the cut ends of the smaller tubes, are also distinctly shown. The microscopic appearances of the morbid growth are depicted in the woodcut, p. 46. It may, however, be well to state that the account there given has been confirmed by the report of the Committee of the Pathological Society appointed to examine the recent specimen.

The reporters, Drs. Bristowe and Pick, say: "Our examination of the lungs, shown to the Society by Dr. Risdon Bennett, confirms the account which he has furnished of them. The bronchial tubes and pulmonary vessels almost to their smallest ramifications are imbedded in a greater or less abundance of dense white fibrous-looking material; which is, therefore, so arranged that on section of the organs the tissue seems mapped out by it into irregular polygonal spaces.

"Under the microscope the adventitious formation is seen to be made up mainly of cells, rounded or polygonal, and for the most part about the size of the cells of the bronchial mucus. These are for the most part collected in the meshes of a fibrous matrix. In some parts the fibrous tissue is predominant; in other parts the cells preponderate, and in places seem to be grouped in loculi of various sizes. We believe that these latter are neither air-cells nor bronchial passages, but the cells of the morbid growth are so like those of the bronchial mucus that it is difficult to be absolutely certain on that point. We distinctly observed (as is described in Dr. Bennett's report) that the cell-growth extended from the seats of its chief development into the tissues separating adjoining air-cells from each other, where it formed rounded excrescences projecting into the cavities of the air-cells, but separated from them by their limiting membrane.

"There can be no doubt that the disease was of a malignant character, and little doubt that the growth in the lungs was secondary to that which had existed in the breast."

Plate 1.



W Hurst del et lith.

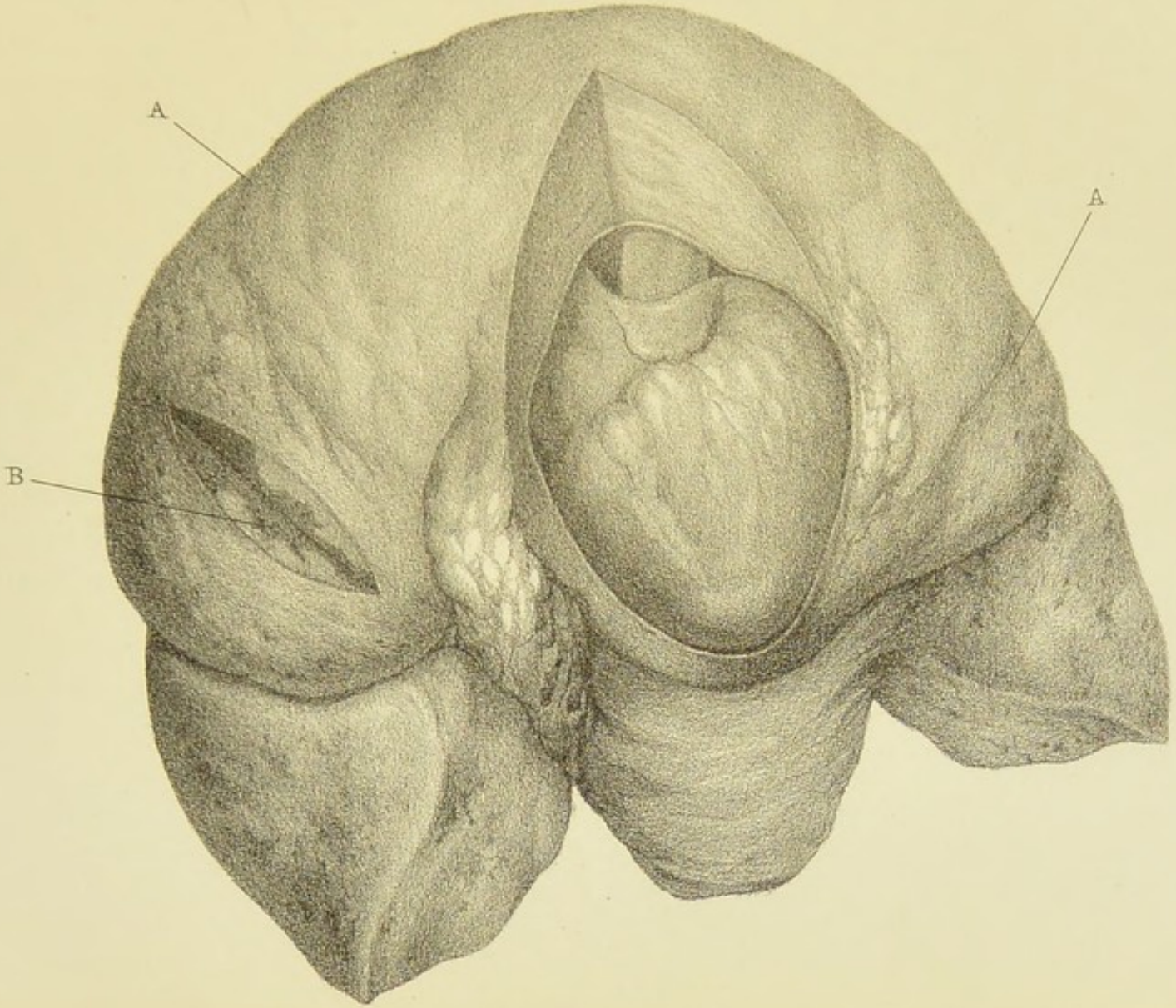
M & N Hanhart imp.

PLATE II

Represents the lungs and heart in the case of lymphadenoma described p. 148, *et. seq.*

A section has been made through the mediastinal tumour and pericardium, so as to show the heart *in situ* and its relation to the main portion of the tumour. The lines A A point to the spots where the thin border of the tumour passes gradually into the pulmonary pleura. At B, a small incision into the lung shows that the new growth had at this point invaded the tissue of the lung.

Plate 2.



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M. & N. Hanhart imp.

PLATE III.

Represents the left lung in the case of lymphadenoma described at p. 148 *et seq.*

A section of the lung has been made from apex to base, and the appearances presented are detailed at p. 158 *et seq.* A A point to the larger masses distributed through the substance of the lung. C C point to sections of an enlarged bronchial gland at the root of the lung. The smaller grayish points scattered throughout the lung represent the bodies closely resembling tubercle, which have so often been seen in cases of Hodgkin's disease.

Plate 3.

W Hurst ad nat del.

M & N Hanhart imp

PLATE IV.

Microscopic appearances presented by the mediastinal growth in the case of lymphadenoma. *Vide* p. 160.

Fig. 1.—A, the wall of a vessel.

B, the clearer spaces corresponding to lymph paths. When the focus was altered lymph cells were seen in these spaces, but fewer in number.

C, the lymph cells lying amongst a homogeneous substance and arranged in the form of tubes or channels. They are irregular in shape and size.

In fig. 2 this tube-like arrangement is shown under a lower power, and seen ramifying in various directions.

In fig. 3 the lymph cells are magnified about 500 diameters, and the homogeneous substance intervening has a firm fibrous appearance.

Plate 4.

Fig. 1.

Fig. 3.

Fig. 2.

W. Hurst ad. nat. del.

M & N Hanhart. imp.

PLATE V.

Fig. 1.—Section of a portion of the upper lobe of the right lung in the case of fibro-cancerous disease, coloured to show not only the aspect presented by the substance of the lung in the fresh state but also the solid mass immediately beneath the pleura, from which numerous white bands extended through the lung as in the opposite lung, depicted in Plate I.

Figs. 2 and 3.—Section of two glands, coloured to show the appearances presented in the fresh state. Fig. 3 was taken from the axilla, and was less vascular but of a firmer and tougher consistence than Fig. 2, which was taken from the groin, was more vascular, and apparently in an earlier stage of disease.

Plate. 5.

Fig. 3.

Fig. 2.

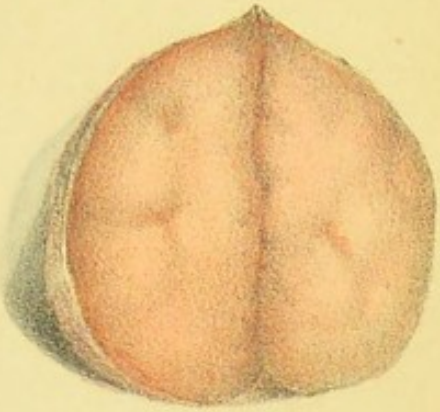
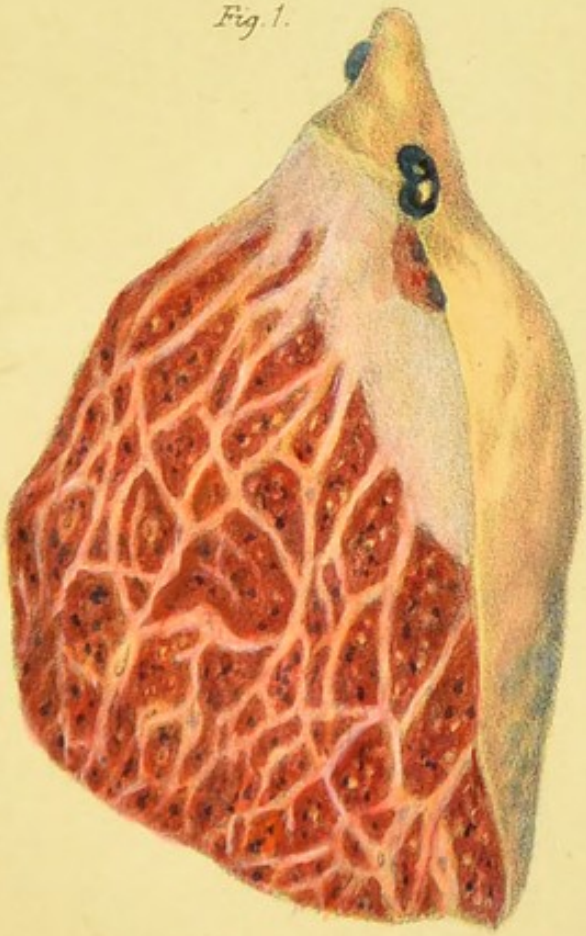


Fig. 1.



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M. & N. Hanhart imp.

CANCEROUS

AND OTHER

INTRA-THORACIC GROWTHS.

INTRODUCTORY.

In the admirable work on 'Diseases of the Chest,' by Dr. Stokes, published thirty years ago, that accomplished physician observes, in reference to cancer of the lungs, "that as yet almost nothing has been done in establishing the diagnosis of this disease;" that "Laennec gives no case in which auscultation was employed, and that authors are silent on the subject." This certainly can no longer be said. A considerable number of carefully observed facts have now been recorded; and Dr. Stokes himself has enriched our literature by a valuable contribution since the date at which his classical work appeared. The literature of the

subject is indeed now rather extensive, and has been reviewed by various authors, and ably sketched by Dr. Cockle in his interesting monograph. Numerous cases are to be found scattered through various journals, both foreign and British, and most systematic works treat of intra-thoracic cancer. The clinical history of cancerous and other intra-thoracic growths is, however, still very imperfect, and the diagnosis in many cases still beset with almost insuperable difficulties.

To the practical physician the subject is fraught with interest, arising not only from these clinical difficulties themselves, but also from the relation in which they stand to the pathology of cancer in general, and the very scant assistance that can be afforded by our art either in the way of prevention, or cure, or even mitigation of the sufferings which the disease entails.

Cancerous disease occurring primarily within the chest is not so rare as was at one time supposed, although there are probably many physicians who have never seen a case. Thus, *three* cases of primary cancer involving the root of the lung, which Dr. Budd has recorded in

the 'Medico-Chirurgical Transactions,' are, he says, the only ones that had fallen under his observation at King's College Hospital during a period of nineteen years. I am not, however, able to give any precise information as to the relative frequency of cancer and other diseases of the chest in this country. Exclusive of a few cases of secondary cancer and of cancerous affections of the larynx and œsophagus, I find up to the present date twenty-three cases recorded in the 'Transactions' of the Pathological Society of London. I have myself met with upwards of thirty cases, and have notes more or less complete of twenty. Without, therefore, adducing the further evidence which the records of surgical as well as medical science would afford, it is manifest that intrathoracic cancer is of sufficiently frequent occurrence to render its natural history and diagnosis a study—not merely of curious interest, but of practical importance to the physician. My remarks will be based chiefly on cases occurring in my own practice, some that I have had the opportunity of seeing in the practice of my colleagues, and twenty-three others taken from the 'Transactions' of the Patho-

logical Society, the latter not having, so far as I know, been made the subject of any general analysis or examination.

There is reason to believe that cancerous disease in general is steadily on the increase in this country. Mr. Moore has shown, by reference to the Registrar-General's returns, that the increase in deaths from cancer in London, coincident with the increase of wealth and the well-being of the population, amounts to 200 *per annum*.

I have not been able to collect and compare the records of a sufficient number of cases of intra-thoracic cancer to make them very available for any trustworthy statistics. But a brief comparison of the cases, which have afforded me the principal facts for these remarks, does not accord with such statistics as I have met with in books. Thus it has been supposed that the right lung is far more frequently affected than the left. But of thirty-nine cases which I have tabulated the left was the principal seat in 14, the right in 9 only; whilst of the remainder, either both lungs were affected, or the disease was confined almost entirely to the mediastinum. As regards sex,

19 were females and 20 males. The age of the oldest patient was 72, and of the youngest 11. Four were between the ages of 20 and 30, eight between 30 and 40, three between 40 and 50, and seven between 50 and 60. The middle periods of life are therefore those in which the disease appears to be most frequently met with. This coincides with the statements of most authors, but I find no such preponderance of males over females as Ebermann and others have found.

Irrespectively of mediastinal tumours, or such as originate in the bronchial glands, all the various pulmonary tissues may be the seat of cancerous disease—the investing serous membrane, the substance of the lungs, and the bronchi; so that the leading symptoms may present the characters either of pleuritic, pneumonic, or bronchial diseases, and their results. It is true that primary intra-thoracic cancer is of much rarer occurrence in certain tissues than in others; but the records of cases that have fallen under my own observation show that it may originate in, or at least may early implicate, any of the intra-thoracic tissues. As a secondary affection, succeeding to sur-

gical operations for the removal of cancerous growths in other parts of the body, there is much less variety, whether as regards the tissues invaded, or the symptoms and the course of the disease, within the chest. The pleural membrane is, in this secondary form, much more frequently and more early involved, and the signs of irritation and inflammatory action are much more prominent, as well as earlier developed. The diagnosis of these cases is, therefore, generally more easy; not that there is anything distinctive in such signs of inflammation, but because, from our knowledge of the natural history of such cases, the occurrence of the phenomena in question may be assumed inferentially, but with confidence, in a large majority of cases, to depend on the supervention of cancerous disease within the chest.

The similarity in many of these cases to tubercular disease on the one hand, or simple bronchial irritation on the other, is no doubt very great; and the diagnosis, apart from the history of the case, would often be extremely difficult, if not impossible. I do not, however, propose to treat, except it be incidentally, of the diagnosis of cancerous disease within the

thorax following on the removal of the disease in other parts.

But the aid to diagnosis which the previous history of the case affords us in these secondary forms of the disease is no less important in the primary. Indeed, in every case of obscure thoracic disease, a careful investigation and study of the anamnesis is of the utmost importance. This, by way of exclusion, if not directly, will often lead us to a correct diagnosis, where it would be impossible from a consideration of the existing physical signs and symptoms alone. The diagnosis must, therefore, be studied in connection with the natural history. In proportion as our experience enables us to accumulate materials for a more complete natural history of the disease, we may expect to render the diagnosis easier; and however great the difficulty in individual cases may be—and no doubt it still is very great—it may with confidence be asserted that it is far less than it was at the time when Dr. Stokes' work appeared.

Of the various species of cancerous disease, the encephaloid is the one which is by far the most frequently met with within the thorax,

and the scirrhous variety the least frequent. I have myself met with but two cases of the scirrhous and not one of the colloid form.

Cancerous growths in the lungs may present forms analogous to all the varieties of tubercular deposits, and these forms may give rise to analogous changes, whether as regards the growths themselves or the effects produced on the surrounding tissues. Thus we occasionally find cancer in the form of minute granular bodies closely resembling miliary tubercle, as well as in masses varying in size from that of ordinary grey tubercle to that of large growths equalling in magnitude a whole lung. Like tubercular deposits, cancer may be infiltrated through all the tissues, but usually it maintains the character of isolated masses, pressing on and pushing aside the surrounding textures without invading them. Rokitansky thinks that, when infiltrated, it is the result of pneumonic inflammation arising in the course of cancerous dyscrasia. The tendency of these disseminated masses, whether large or small, to excite inflammation in the surrounding tissues, varies much. They usually remain apparently or an indefinite time (as is sometimes, though

rarely, the case with tubercle) without exciting inflammation, or giving any indication, from deranged function, of their existence. The difference, however, in this respect between cancer and tubercle is considerable. It is seldom that we meet with any extensive diffusion of tubercular deposits through the lungs without evidence of more or less inflammation and its consequence in some parts. But it is common to meet with numerous cancerous masses equally distributed throughout even both lungs, and the intervening lung-tissue remain perfectly healthy, to all appearance. In this respect we shall find that there is a marked difference in cases of mediastinal tumours which ultimately invade the lungs. This remarkable and important fact no doubt goes far towards explaining the difficulty of detecting the existence, during life, of certain forms of pulmonary cancer; for it is not only the ordinary physical signs of irritation and inflammatory changes of which we are thus deprived, but also the corresponding constitutional disturbances.

In other cases, however, ulterior changes do take place in the lung and simulate very

closely those which result from the progress of tubercular disease. There are various ways in which such degenerative changes are brought about. In some instances the cancerous deposit breaks down, and a certain amount of the surrounding lung-tissue is destroyed, and we have small cavities or vomicæ formed, as in the ordinary progress of tubercle. But true ulceration of cancer of the lung, it is generally believed, is very rare; destruction of lung-tissue and consequent gangrene is, however, less rare. Of such cases I have seen several, and shall have an opportunity of giving some examples. When extensive gangrenous destruction of the lung has been met with in connection with cancer, it has often been merely the result of progressive increase of a cancerous mass, entailing either obliteration of blood-vessels or destruction of nervous influence. But, whatever may be the true nature of the pathological processes by which all these changes are brought about, the result is that we have a variety of structural alterations which are in no way distinguishable by their physical signs, during life, from those which characterise tubercle; and it is from the consideration of other

circumstances, or from the progress of the case, that we must arrive at our diagnosis. This, however, will be best illustrated by adducing examples of the several forms of cancerous deposits that have been presented to my observation. For clinical purposes, the various forms of intra-thoracic cancer may be conveniently arranged in three classes.

1. Those in which cancerous deposits usually in masses varying in size are disseminated through the lungs having more or less analogy with disseminated tubercle, but without inducing any change in the intervening lung.

2. Those in which the cancerous growth is more localised, attains, for the most part, to a greater size, and leads to important ulterior changes, such as ulceration and gangrene.

3. Mediastinal or other tumours, inducing pressure on the tubes, vessels, and nerves, with all its important and very various consequences.

SECTION I.

CANCEROUS DEPOSITS DISSEMINATED THROUGH THE LUNGS.

Cancerous deposits in the form of minute tubercular bodies scattered over the pleuræ or through the lungs are not infrequently met with, associated with other forms in some other part of the chest. Less often, however, do we meet with miliary cancer either as a primary disease of the lungs or unassociated with some other form of intra-thoracic cancer. Where the cachexia is strong, and especially where the disease has already existed some time in one or more localities as a local affection, we occasionally find it developed by a rapid and almost simultaneous deposit throughout the system in the form of minute cancerous granules scattered over the most varied surfaces and through almost all the tissues of the body. Many of these cases have been characterised by all the

symptoms of acute febrile disturbance, such as we find in connection with general acute tuberculosis. But, although as a strictly primary affection of either lungs or pleura, miliary cancer may be rare, it is not infrequently met with, associated with the earliest and sometimes the only symptoms of thoracic disease, and sometimes proves to be really the only form of cancerous disease within the chest. The following case will illustrate this remark.

Case 1. *Disseminated miliary cancer of lungs, &c.*—A. L—, a servant girl, 15 years of age, was admitted into St. Thomas's Hospital under my care on the 25th April, 1865. The history that was obtained of her previous health was that till three months previously she had been quite well. She had then suffered from debility and swelling of the hands and lower extremities. These symptoms were relieved by rest and medical treatment; but she had never regained her usual health and strength. The catamenia had not yet appeared. On her admission she was feverish, and had a hectic flush on her face; the pulse was quick, and she complained of thirst. The right leg was a little swollen, and

there was a line of redness and tenderness extending from the knee to the groin. The respiration was quickened, and she had some cough with slight mucous expectoration; but she had had no hæmoptysis. On examining the chest, the respiration appeared to be somewhat harsh in both apices, but the percussion-note was normal. There was a good deal of dry rhonchus heard in various parts. After slight superficial suppuration over the right knee, the swelling and inflammatory blush of the thigh disappeared, and the constitutional disturbance subsided. Her tongue became clean and the appetite good. On the 22nd May it was observed that the hepatic region was enlarged, and both lobes of the liver could be distinctly felt some way below the ribs. On the right side, where the enlargement was greatest, there was pain and tenderness on pressure, and the superficial veins were enlarged. The bowels were loose, and there was no icterus. Her appetite was tolerable, pulse 80, and there was no longer any general constitutional disturbance, nor any cough. The hepatic enlargement, however, continued steadily to increase; and on the 2nd of June had extended to the umbili-

cus. The pulse was then 120, and the tongue dry, with anorexia and looseness of bowels. The thoracic symptoms had returned; the cough became very troublesome, and was attended by more or less of simple mucous expectoration. The respiration was hurried and shallow, and she complained of dyspnœa. There was, however, no dulness on percussion of the chest to be detected anywhere, but a good deal of diffused rhonchus and loose mucous crepitation. She died on the 17th June, having complained much of dyspnœa for some days before death, as well as of uneasiness of the abdomen. She had become much emaciated, having had much diarrhœa and entire anorexia.

Post-mortem examination.—Both lungs were congested, and contained scattered throughout numerous small round whitish bodies closely resembling miliary tubercles. At the anterior edge of the right lung there was also a mass of yellow tissue, somewhat soft, about the size of a cherry. The right lung contained a patch of pulmonary apoplexy. The heart and its valves were healthy. The peritoneum contained some serous fluid, and some shreds and filaments of partly organised lymph. The liver was greatly

enlarged, weighing 7 lbs. 12 oz. Its tissue was very fatty, and the anterior part of the right lobe which projected beyond the ribs presented an irregular rounded protuberance. There was also a large tumour attached to the posterior and inferior part of the right lobe, which pushed the greater part of the liver forwards. Upon cutting into the liver, other tumours were found in its substance, which were either of a pale yellow colour or stained greenish from bile, or in other instances blood-stained. They were rather softer than the ordinary liver consistence, but nowhere pulpy or exuding milky juice. There was an enlarged gland about the size of a walnut adhering to the posterior part of the liver, presenting the same physical characters as the liver-tumours; also similar enlarged glands in front of the lumbar vertebræ. The spleen was rather large, and contained a few small yellowish nodules similar to the liver-tumours. The stomach and intestines were healthy. The kidneys presented several small white masses in their cortical substance, like miliary tubercles; they were otherwise healthy; the bladder was healthy; the uterus and ovaries small as in infancy. Portions of the tumours in the liver,

of the enlarged glands, and of the deposits in the lungs and kidneys, were examined microscopically, and were all found to present similar appearances; consisting mainly of a cell-growth, the cells being tolerably large, with a clear well-developed outline, varying greatly in shape, many presenting angular forms, some fusiform, and like broken fibres. They were mostly nucleated, the nuclei not being very large, but distinct, and often containing a nucleolus. These cells for the most part did not contain any fat-globules, whereas the ordinary liver-structure was loaded with oil. The appearances here described were most distinctly seen in the lymphatic glands, but were also sufficiently characteristic in the other parts to justify the conclusion that the various deposits were all of the same nature.

When first seen, there was every reason for supposing that in this young girl the symptoms referable to the chest depended on the presence of scattered tubercles. The age, the previous history of ill-health, and the non-appearance of the catamenia and hectic aspect, together with the general febrile disturbance, all seemed to point to tubercular disease. All this, however,

was probably due in great measure to the constitutional disturbance excited by the local inflammation of the knee and thigh, as all the main symptoms disappeared on the subsidence of the local inflammation. There was no return of the thoracic symptoms till after the manifestation of extensive hepatic disease. That this was malignant in its nature, no doubt was entertained during life; but when, as the hepatic enlargement increased, the constitutional derangement became increasingly severe, and the thoracic symptoms returned, there was nothing in their character to distinguish them from the like symptoms which had formerly existed, and had entirely disappeared. Nor was there anything in the physical signs at all distinctive. It is, however, worthy of note, that the hurried respiration and the dyspnœa were much more marked symptoms in the latter stage than in the earlier. But these are among the most characteristic symptoms of acute miliary tubercle; and in the present instance much of the dyspnœa was in all probability due to the pressure exercised by the enlarged liver and its encroachment on the thoracic cavity. Viewing also the general state of constitutional exhaustion, there

did not seem to be anything that could with confidence be considered as in any way specially referable to the presence of the miliary cancerous deposits in the lungs. These, however, were very numerous and scattered throughout both lungs; and their microscopic characters and identity of structure, with the deposits in the liver and elsewhere, leave no doubt as to their true nature.

Recurrent signs of bronchial irritation without any sufficient assignable cause, Dr. Stokes thinks, are characteristic of disseminated cancer, and may often form sufficient ground for the diagnosis. This is a point to which I shall probably have occasion again to revert, because I have seen reason to believe that such signs of bronchial irritation may attend any form of cancer within the thorax.

A very interesting case of primary miliary cancer of the lungs is recorded by Dr. Hilton Fagge in the eighteenth volume of the 'Transactions' of the Pathological Society. The subject was a man 50 years of age, who was admitted into Guy's Hospital under the care of Dr. Wilks. He had been liable to winter-cough for some years, and had been obliged to leave

work for seven weeks before his admission, owing to debility and shortness of breath. He was a fine, well-built man, with a well-formed chest. When first examined in the hospital, he was sitting propped up in bed, quite unable to lie down, and had some dyspnœa. The heart's sounds were perfectly normal, and the anterior surface of the chest fairly resonant; but there was dulness over each posterior base. The expiratory murmur was prolonged and loud at each apex, where slight sibilant *râles* were heard. Posteriorly, at the bases, sibilant and subcrepitant *râles* were heard, with slight bronchophony, especially on the left side. The legs were œdematous and the urine exalbuminous.

The case was regarded as one of capillary bronchitis, with more or less of pneumonia, and he was cupped and took a saline mixture with small doses of antimony. The following day he appeared to be relieved, but his face was dusky and his heart irregular. The subsequent day he died suddenly, after passing a very restless night.

Each pleural cavity was found to contain a large quantity of clear transparent fluid of a

brownish colour. In the pleural membrane were found a few minute plates, the cancerous nature of which was doubtful. The lungs were studded with small cancerous deposits, looking very like tubercles, but larger than the ordinary kind of tubercle. The two lungs were affected in exactly the same way and to the same degree. The apices were nearly free, containing only a very few of these deposits. The lungs themselves felt bulky and firm, and resisted section more than lungs affected with pneumonic consolidation or miliary tubercle. The appearance of the cut surface was peculiar. A few of the cancerous masses were as large as hemp-seeds, and looked quite white and like small tumours; but most of them were much smaller and closely set together. Similar small tubercle-like deposits were found in the heart and pericardium, and a few in the liver.

In this instance, as in my own case already given, we see how remarkably little tendency there appears to be to pneumonic inflammation as the direct result of cancerous deposits in the lungs. The symptoms, indeed, were those of capillary bronchitis, with more or less of pneumonia; but the immediate cause of death ap-

pears to have been passive effusion into the pleura, as the result of the general debility and cachexia—and the actual condition of the lungs not such as characterises inflammation resulting from miliary tubercle.

There can be no doubt, as the reporter observes, that the lungs were the primary seat of the cancer; and that a point of great interest in the case is, that the apices were much less thickly studded with the cancerous deposits than other parts of the lungs. Other instances, however, of disseminated cancer, afford no evidence for believing that the apices are less liable to cancerous deposits than other parts of the lungs. Thus, in a well-marked instance of primary cancer of the lung recorded by Dr. Quain,* both lungs throughout were studded with small hard masses, varying from the size of a pea to that of a walnut; and such pleuritic adhesions as existed were connected with the lower lobes. The symptoms during life were those of tubercular disease, with pleuritic effusion of the right side, which, after death, was found distended by three pints of sanguineo-serous fluid. On the other hand, Dr. Sieveking† reports a case of

* 'Trans. Path. Soc.,' vol. iii, p. 251. † Ibid., vol. i, p. 195.

cancer of the stomach with secondary melanotic deposits *confined to the apices* of the lungs. In this instance, the only positive sign elicited by percussion was dulness of the left subclavicular region; and the chief symptom referable to the lungs, urgent dyspnœa.

In most points of view, we find tubercle to contrast with cancer, rather than to present any affinity. The mode of development and growth appears to be essentially different; but, as regards the affinity of cancer for one part of the lungs rather than another, there is nothing, I think, to show that in this respect it stands in any antagonism to tubercle.

I have not myself met with any example of the coexistence of tubercle and cancer. There is sufficient evidence that the two may coexist; but none, I think, to prove that this coexistence is anything more than a coincidence. It may not always be easy to distinguish the two from their microscopic characters alone; but there can be no reasonable doubt as to many of the cases cited in proof of the coexistence. Lebert states that he has never met with the supervention of cancer in the course of phthisis, and believes that it must be very rare; whilst

Rokitansky thinks it more usual for cancer to follow tubercle, than the reverse. He, however, thinks that the two have no real relation beyond that of coincidence. Dr. Quain's case, related to the Pathological Society, and recorded in the third volume of the 'Transactions' of that society, appears to be an unquestionable instance. A large firm carcinomatous tumour occupied the mediastinum, and encroached on the right lung. It extended deep into the structure of the lung, but did not reach as high as the clavicle. The upper lobe was studded with tubercles, the left lung being healthy. On examining by the microscope the encephaloid mass and the tubercular deposit, the distinctions appeared to be well marked and decisive. This, however (with the exception, perhaps, of Pollock's case*), appears to be the only unquestionable example among the forty-three which form the basis of my remarks. There are two others in which the real nature of the so-called tubercles was doubtful.

Another of the rarer forms of diffused cancerous deposit in the lungs that I am able to illustrate from my own practice offers an example

* 'Trans. Path. Soc.,' vol. iii, p. 254.

of primary cancer in which the growths had in most instances undergone more or less disintegration and consequent contraction of the central portions, so as to afford a close resemblance to the appearances presented by obsolescent tubercle or a hob-nailed liver. The details of the post-mortem examination, and the microscopical appearances of the deposits, are given by Dr. Bristowe.

Case 2.—Eliz. Wilkinson, aged 36, a servant, was admitted into hospital June 1st, 1858. She stated that for six months she had had cough, but no hæmoptysis; that the catemenia had been absent three months; and that since then she had had leucorrhœa. Although much emaciated, she had never been laid up till her admission. Three months previously, while drawing a hard cork, she felt a sharp pain in the left side; and to this she attributed her illness, having had shortness of breath ever since. She had not had any palpitation, nor any swelling of the extremities. There was considerable lateral curvature of the spine. There was dulness on percussion under the right clavicle, with large and fine crepitation. Respiration was

harsh under the left clavicle. She had some mucous expectoration. Vocal resonance was not much increased. She had slight febrile disturbance and fleeting pains in the limbs. The treatment consisted of tonics, with expectorants, sedatives at night, and cod-liver oil; subsequently, antispasmodics, and liquor vesicatorius to the left side, which became very painful. She had much irritability of the stomach before death, which took place on July 10th, 1858, apparently from exhaustion.

Post-mortem examination, July 12.—The heart and pericardium were healthy. Both pleuræ presented numerous firm cellular adhesions. The right lung was large; the left was small and misshapen, to accommodate itself to the distorted spine and contracted side. The whole surface of both lungs was remarkably fissured; and often the fissures were so deep as to give the lung a hob-nailed appearance. On section, the lungs were found studded with patches of greyish-white material, rather firm, but yielding, on pressure, large quantities of creamy juice. The sectional surface of these patches varied from an inch and less in extent, differing in shape, and for the most part distinctly margi-

nated, but giving clear indications that the material had infiltrated rather than displaced the lung-tissue. The fissures in the lung corresponded to the centres of these deposits. In some parts, the cancer, instead of forming distinct masses, infiltrated the lung-tissue without destroying it, giving the appearance of purulent infiltration. The lung-tissue between the masses was crepitant and tolerably healthy. The bronchial tubes contained a good deal of muco-purulent fluid. The pulmonary arteries and veins, and the bronchial glands, were healthy.

The liver was large, pale, and for the most part healthy. It presented, however, three or four masses of cancer, of about the size of a horsebean, two of which reached the surface. The left kidney was increased in size, and congested, but healthy; of the right, no trace could be found. The left Fallopian tube formed an elongated cyst, the interior of which was sacculated and rugous, and contained clear fluid. The microscopic appearances were those of cancer. Where degeneration had occurred, numerous compound granular cells were seen. Pearly patches, seen here and there, contained earthy

matter, which, when acted on by acetic acid, evolved bubbles of gas.

Here, again, notwithstanding the extent to which the lungs were implicated by the cancerous growths, we have it stated that the intermediate lung-tissue was healthy. Nor can we, I think, refer the old firm pleuritic bands to the consequences of the cancerous disease. They were more probably due to former pleuritic attacks, associated with the abnormal state of the thoracic organs from distorted spine. But the abundant muco-purulent secretion in the bronchi shows how generally, not to say invariably, the pulmonary mucous membrane is affected by all other morbid conditions of the lungs. As regards the diagnosis, I must confess that I was unable to refer the pulmonary symptoms during life to any other cause than tubercle and the deranged circulation consequent on the spinal disease. I was not, however, fully satisfied as to the existence of tubercle. The constitutional condition did not harmonise with this view of the case.

The *bronchial tubes*, although so very generally implicated in the progress of cancer originating in other parts of the lung, especially in the me-

diastinum and bronchial glands, are believed to be very rarely, if ever, the original seat of the disease. It would, however, appear that the bronchial tubes may be the channels by which cancerous germs are transmitted to distant parts of the lungs. Dr. Moxon has related an interesting example of this, in which the germs of epithelial cancer affecting the trachea were carried along the bronchi, and deposited in the centre of the lobules of the lung, where they gave rise to small rounded firm growths, which presented in very characteristic form the "bird's-nest" capsules of the epithelial cancer of the œsophagus and trachea, whence they appeared to have come.

Of the scirrhous or fibro-cancerous variety of the disease, my notes afford me two examples, implicating mainly the bronchial tubes and their investing tissue, running along their course, and encroaching on and diminishing their calibre. The interlobular septa and the investing pleural membrane were also the seat of similar disease. In the first of these cases the pulmonary disease was unquestionably secondary to the cancer of the stomach. All the symptoms were such as might fairly be referred either directly to the

disease of the stomach and allied organs, or to the constitutional derangement and exhaustion resulting from the general dyscrasia. The chronic cough of which the man had for some years been the subject presented nothing unusual in its character, was not a prominent symptom during the time that he was in the hospital, and was not associated with any physical signs leading to the suspicion that the lungs were the seat of the very remarkable kind and amount of disease discovered after death. Especially is it to be observed, that there was no marked dyspnœa, and no true febrile disturbance.

Case 3.—W. H—, a gardener, sixty-eight years of age, was admitted into hospital on June 16th, 1859. He stated that he had been ill six months ; that previously he had had good health, with the exception of a chronic cough which he had had for some years. He complained chiefly of epigastric pain and distension, increased by taking food. For some time his appetite had been poor, and he had lost flesh rapidly. Only within the last day or two had there been any vomiting. The urine was abundant, and free from

albumen; bowels regular; no febrile disturbance. His aspect was anæmic and somewhat cachectic; the tongue red and furred in patches. On examining the abdomen several tumours were observed in the abdominal integuments, one immediately above the umbilicus, which, he affirmed, had been there for many years, and which appeared to be attached to the sheath of the rectus muscle. He emaciated rapidly after his admission, having frequent vomiting and much epigastric pain, and subsequently jaundice.

The post-mortem examination was made by Dr. Bristowe, and the following is his detailed description of the appearances presented by the lungs. The body was extremely emaciated and deeply jaundiced. There was a milk-patch on the front of the heart; otherwise the pericardium was healthy. The heart was healthy, but flabby. The valves were competent; but there was a little earthy deposit in the right angle of the mitral valve, and a little along the attached margin of the aortic, but sufficient, in connexion with one curtain, to render it somewhat rigid generally. The pleuræ were free from adhesions, and their parietal portions were generally

healthy; the diaphragmatic surface of each was studded here and there with projecting lenticular patches of white cancer from a quarter of an inch in diameter downwards; and a group of similar formations, in an area equal to that of a five-shilling-piece, was seated over the central portion of the left seventh rib, which in this situation, and for about an inch of its length, was destroyed by cancerous infiltration. The lungs were somewhat large and heavy, and presented a very remarkable appearance. The general surface was congested, but thinly covered by what looked at first sight like a leprous eruption. This consisted of flat whitish circular patches, from half an inch in diameter downwards, which had coalesced in many places, and formed sinuous patches or bands of various extent. The patches were pretty equally diffused over the entire surface of both lungs, and were so flat and little elevated as scarcely to be perceptible to the touch, or even the sight, except by their whiteness and opacity. It frequently seemed, too, that the edges were a little better defined than the central portions. In a very few instances, the central portion of a patch was elevated into a hemispherical tubercle.

On cutting into the lungs, they were found generally though sparely crepitant; but on close examination they were clearly ascertained to be studded rather thickly with cancerous material, which, however, was variously and somewhat peculiarly arranged. 1. In many parts, but by no means uniformly so, it existed in the form of scirrhous infiltration running along the bronchial tubes and vessels of the lung, surrounding them, apparently, in the first instance; then incorporating their parietes; and finally encroaching on and diminishing their calibre, though in no case distinctly obliterating them. The larger trunks were generally unaffected, or affected only in an early stage; the tertiary and subsequent divisions were those most obviously diseased. Constrictions arising in the manner indicated were discovered in both arteries and veins, but there were no nodulated or papillary growths in their channels. In those tubes in which the disease was most marked, *the mucous membrane was opaque, thick, and wrinkled*. 2. Numerous very distinct but thin bands (from half a line in thickness downwards) of scirrhus were found intersecting the lung-tissue in various directions. By tracing and examining them, it

was rendered obvious that they were the result of cancerous growth along the septa separating the lobules from one another; and that they were, therefore, of the same nature as, and had originated in similar tissues to, the patches upon the surface of the lung. 3. Besides the above, there were numerous spots, from the size of a lobule downwards, in which the tissue of the lung was more or less solid, and infiltrated with malignant growth. But it seemed clear that all these were secondary to the formations previously described, and due, as it were, to their outgrowth into neighbouring tissues. Many of them were subjacent to the superficial patches, and had obviously sprung from them. The relations of those seated in the substance of the lung were necessarily less distinct; but there was sufficient reason to regard them as having a similar dependence on more central scirrhous tracts. A few of the bronchial glands were the seat of scirrhous infiltration. There was extensive ulcerated scirrhus of the stomach, with peritoneal cancer extending along the capsule of Glisson into the liver, and causing obstruction of the bile-ducts; but all other organs, as well thoracic as abdominal, were healthy.

Although, as has been stated, cancer affecting the bronchi, either primarily or independently of other parts of the thoracic organs, is, to say the least, extremely rare, if it ever occurs, cancerous vegetations from the inner surface or the tubes occur sufficiently often to give special aspects to the case, and sometimes to facilitate the diagnosis. In a case related by Dr. Peacock, considerable portions of cancerous matter, taking the form of bronchial casts, were from time to time expectorated; and in other instances expectorated matters have shown evidence of the cancerous nature of the disease. But the amount and character of expectorated matters vary greatly in different cases. Mostly, the expectoration is simply thin frothy mucus. Viscid, glairy, red-currant jelly-like matter is by no means so common or diagnostic a sign as has been supposed of any form of intra-thoracic cancer, and certainly not of these varieties. The sputa not unfrequently are muco-purulent, but never, I believe, of the peculiar nummular character frequently seen in phthisis. Microscopic examination of the sputum would probably, in many cases, give direct evidence of the cancerous nature of the disease.

The following case presents another example of extensive implication of the bronchi and connective tissue of the lungs by scirrhous deposit, but differing very materially in its clinical aspects from case 3.

Case 4.—*Secondary scirrhous or fibro-cancerous infiltration of connective tissue of lung, &c.; succeeding to the removal of primary cancer of mamma.*—Maria Thorpe, æt. 42, a cook, single, very well formed and rather stoutly built; of healthy appearance, dark hair, and well nourished, came under my notice February 25th, 1871. Her mother is living, æt. 63, and in good health. Her father died many years ago "of tumour in the throat." Her only brother is living, and in good health. Asthma, she says, is the family complaint.

Previous history.—For four years past she has had cough in the winter, but considers herself to have been in good health till two years ago, when she first detected a swelling in the left mamma. The last two winters she had less cough than before. She never had hæmoptysis nor rheumatism, but has had epistaxis. Last July she went into St. Mary's Hospital, where the

mammary tumour was removed by the knife. The wound healed completely and speedily, and she remained well till Christmas last, when she had an attack of so-called bronchitis. At this time she noticed that her breath was shorter than it had ever been before, and this shortness of breath, as well as the cough, have continued ever since. She thinks she has lost flesh latterly, and has been subject to sweatings.

Present state.—The situation of the left mamma is occupied by a large indurated cicatrix, surrounded by considerable thickening and hardening of the integuments. There is some lividity of the edges of the cicatrix, but no ulceration. Some enlarged lymphatic glands may be traced along the edge of the pectoral muscle towards the axilla, where there are two or three enlarged glands. She complains of no pain in the diseased tissues, nor is there any tenderness. The integuments are infiltrated and hardened for some distance around the cicatrix.

She considers her cough to be somewhat better than it has been, but her breath to be even more short. She has some expectoration, not copious, and consisting for the most part of glairy mucus, mixed with some pigment and

opaque mucus. This was examined under the microscope, but revealed nothing of a special character. The thorax is ample and well formed, everywhere resonant on percussion, unless it be under the left clavicle, where there is some questionable dulness. The respiration, also, under the left clavicle is somewhat deficient; elsewhere it is distinct and tolerably free, but everywhere mixed with sibilant and mucous râles; sometimes there is much prolonged wheezing. The breathing is short and frequent, and the least exertion induces considerable dyspnœa. The lips are slightly livid, but the general colour of the face is good. Skin soft and sweating. Pulse 100, feeble. The heart's sounds are normal. The catamenia regular. Bowels confined, tongue white, and appetite only moderate. She complains of considerable weakness. Temperature 99·6 a.m.; 99·3 p.m. She was ordered the effervescing calumba mixture, and squill and comp. ipecac. pills at night, and the ether and soda mixture occasionally for any unusual difficulty of breathing.

After being ten days in the hospital her general condition appeared to be somewhat improved; she had less cough and expectoration,

and the signs of bronchial irritation had considerably diminished. But her dyspnœa was not correspondingly relieved. A few days later she had again more cough, and the expectoration was more muco-purulent in character; but there was not more febrile disturbance. The skin continued moist or sweating, and the temperature 98·9.

March 31st.—She complained greatly of shortness of breath, which had been steadily becoming more and more distressing. The chest, however, remained perfectly resonant throughout, and the mucous râles had almost disappeared, although there was from time to time a good deal of wheezing and whistling. At this period the least movement even in bed seemed to distress her, and, as she expressed it, her "breath was gone in a moment." Her face was at this time paler and more pasty in appearance. She had evidently lost flesh, and her appetite was very poor. The cicatrix had become more prominent, and had assumed a more discoloured and livid appearance. The temperature, also, was higher than it had hitherto been, viz. 100·2 a.m.

April 7th.—She passes very bad, distressing

nights from the extreme breathlessness, sitting up in bed, and fearing to make the least movement. She dislikes being noticed or in any way disturbed, but always says that she has no pain. The cough is not troublesome, and there is very little expectoration. Auscultation shows that but little air enters the vesicular texture of the lungs, and the respiration has a short whiffing character. The chest is, however, throughout, as far as can be ascertained, quite resonant on percussion, and of normal form.

Subsequent to the above date the face became dusky and livid, and she was extremely restless. Finally she became drowsy and slept much, and expired somewhat suddenly, as though from syncope, on the 10th April.

Post-mortem examination.—April 11th.—Body not emaciated; subcutaneous fat on abdomen an inch in thickness. Muscles firm and ruddy. Cicatrix left after the removal of the breast, extends from the left edge of the sternum almost into the axilla. Cicatrix itself and adjacent tissues dense, indurated, and prominent; no ulceration. A small chain of lymphatic glands could be felt running along the edge of the pectoral

muscle. Axillary glands but slightly enlarged and hard.

On removing the integuments from the thorax, which was well covered by muscle and abundant fatty tissue, the cicatrix was found to be firmly attached to the ribs, and required to be cut away with some force; it had a yellowish, fibroid appearance, and cut like gristle. The left pleura was found to be free from adhesions, as was also the right, with the exception of one or two firm bands in the upper part. The costal pleura corresponding to the primary growth presented to the naked eye no appearance of change.

The lungs, heart, and pericardium were removed entire.

The bases of the lungs were adherent to the diaphragm so firmly as to be separated with difficulty. The pericardium was adherent to the heart at several points, and the latter was marked here and there by milk spots, which had invaded the muscular tissue. On the external surface of the pericardium over the apex of the heart, to which it was not adherent, was a cancerous-like patch consisting of hard, small, grayish-white nodules and ridges. The auricles

were invaded externally by similar growths, having the appearance of "drops of tallow," on the surface. There was a fibroid nodule on one of the corpora arantii of one of the semi-lunar valves of the aorta. Two of the pulmonary valves were semifused. The tricuspid and mitral valves were normal, but the endocardium on the auricular surface appeared opaque. Both ventricles were uncontracted.

The lungs appeared to be in a state of inspiration, and had not collapsed. They were of a dirty white colour. The pleura was traversed here and there by fine irregular lines, of a yellowish colour, raised above the surface. The margins of the lungs were decidedly emphysematous. On section they showed an apparent general hypertrophy of the connective tissue and presented a remarkable reticulated appearance, being traversed by fine yellowish-white bands, which marked out the lobules, and in some cases even the air-cells with the greatest distinctness.

The morbid growth appeared to have followed the course of the bronchi, which it had also invaded, and thence spread through the connective tissue of the lungs. On the cut surface

numerous small points were seen, having, at first glance, very much the appearance of miliary tubercle. On closer examination, however, they were found to be cut ends of minute bronchial tubes which had become thickened and hardened by having undergone fibro-cancerous change. In each case by gentle pressure frothy fluid could be pressed from their extremities. There was no true solidification of the lungs or general infiltration, except as regarded the free margin of the lower lobes, especially of the right lung, which, on section, presented a general yellowish-white appearance, were firm, and had lost all trace of lung tissue to the naked eye, having very much the look of portions of a cancerous mammary gland. In the upper lobe of the right lung, immediately beneath the pleura, was a solid mass about one inch long and half an inch wide. It was firm and tough, yielded no juice, and resembled fibroid tissue. Extending from this mass were numerous white bands, and the pleura over it was thickened, but not very much so. The lungs contained much air, and floated readily.

The bronchial tubes were dilated, occasionally sacculated, and much thickened by morbid deposit and infiltration.

The bronchial glands contained much pigment, were not enlarged, and were apparently free from disease.

The liver was somewhat enlarged, and presented a nutmeg appearance. There were several hard, whitish masses close to the surface. The largest in the upper portion of the right lobe had, on section, a diameter equal to that of a penny piece. There was but one nodule in the interior of the liver of the size of a hazel-nut, near, but not in connection with, a large branch of the portal vein. It consisted of tough, grayish, fibroid-like tissue.

The supra-renal body of the right side was diseased, its medullary portion having undergone a somewhat similar fibroid change.

The kidneys and spleen were normal, with the exception of dark venous engorgement.

There were a few enlarged, apparently fibro-cancerous glands near the lower omentum, but the mesenteric glands elsewhere were not affected.

The intestines were normal.

Microscopical examination made by Dr. G. H. Sutton.—The tumour situated in the upper lobe of the right lung consisted of fibro-cellular tissue. A number of corpuscles and nuclei were

seen lying in a fibre matrix. The corpuscles varied in size, and were mostly spherical or ovoid in shape. Some of them were irregular in form, apparently due to pressure. There were also some spherical cells which contained distinct but not large nuclei, and some granular matter. The fibre stroma was very abundant in some situations, and it formed the most prominent part of the growth. The fibres were ill-defined, and many of them had large nuclei. In other situations the corpuscles were very numerous, and preponderated over the fibre-like tissue.

A number of corpuscles were seen extending from the part forming the tumour into the interlobular connective tissue, and they were observed very distinctly amongst the elastic fibres forming the alveolar walls of the air-cells.

Sections were made of other parts of the lungs, and examined; but in every section the new fibro-corpuscular growth was seen lying in great quantities around the bronchial tubes and vessels, and it existed in greatest abundance in these situations. In consequence of this the connective tissue layer around the minute tubes and vessels seemed very much increased.

It was further observed that the new growth had extended from the thickened tissue lying around the tubes and vessels along the minute divisions of the bronchi and vessels into the walls of the air-cells, and in this manner almost the whole of the lung seemed reticulated and mapped out by this new fibro-corpuscular tissue.

The subjoined woodcut represents a section of the lung showing the fibroid growth.

Plate I represents the appearances presented by the whole lung when cut through, and a

coloured representation of a portion of the same is given on Plate V.

The history, the general symptoms, and the physical signs in this case admitted of no hesitation as to the diagnosis; and the progress of the case and the variation in the pulmonary phenomena were watched with unusual interest. The signs of bronchial irritation were at one period very general, and no others were present throughout the case; they varied, indeed, in intensity and extent, and were sometimes associated with more, and sometimes with less, of prolonged wheezing, and evidence of deficiency of air entering the vesicular structure, but it was only in the later stages of the illness that the dyspnœa assumed anything of the character of a paroxysmal or asthmatic character. The dyspnœa, however, was great, and disproportionate to the physical evidence of bronchial exudation or obstruction, assuming at last the form of suffocative dyspnœa, of which some of the older authors speak, as characteristic of secondary cancer of the lung, following on the removal of external cancer. And I have noticed the same thing in other cases where patients have

died with evidence of pulmonary disease succeeding to external operations for cancer, but where no opportunity has been afforded for post-mortem examination.

But the special characteristic of the dyspnœa, distinguishing it from that attendant on every ordinary form of bronchial disease, was this, that the signs of bronchial irritation, the râles, cough, and expectoration diminished, and almost entirely disappeared, whilst the dyspnœa and breathlessness increased, the chest remaining perfectly resonant, and there being no signs of pressure, nor till towards the fatal termination any signs of venous congestion. There was little, if any, febrile disturbance, but great and daily increasing debility. In the absence of signs of pleuritic irritation, the case differed from most instances in which cancerous disease within the thorax succeeds to the removal of an external cancer, and as the post-mortem examination revealed, the pleural membrane was free from disease. The case affords an interesting study for the pathologist who would discuss the mode of dissemination of the disease. To me it appears opposed to the theory of mechanical dispersion, and strongly to favour

the belief that it was through the intervention of the constitution that the lungs became so extensively implicated. Whether there was anything specific in the nature of the bronchial affection attended by cough which preceded the first indications of the mammary disease it would be difficult to say; but it is worthy of remark that after the disease in the breast had revealed itself the bronchial symptoms were mitigated, and again returned, after the operation.

SECTION II.

CANCEROUS DISEASE LIMITED TO CERTAIN PARTS OF THE LUNGS.

Passing now from the consideration of examples of diffused cancerous deposits in the lungs, having more or less analogy with diffused tuberculisation, I select some examples illustrative of limited implication of the lungs and ultimate changes of structure, in which, during life, the physical signs often correspond so closely with those which are common to chronic limited tubercular disease, passing into the stage of complete pulmonary disintegration, as almost to defy the most acute powers of diagnosis. Such cases are not, however, very common; *i.e.*, cases uncomplicated with unquestionable evidence of tumour or some other indication, rendering it plain that we have to do with something different from ordinary tubercular disorganisation.

CASE 4.—*Cancerous growth involving the left apex; ending in gangrene and death from hæmorrhage.*—G. B—, aged 57, was admitted the 5th September, 1863, and died on the 19th. He was a tall, spare man, of phthisical aspect, anæmic, the subject of great debility, and slight cough, which was once or twice attended by slight hæmorrhage. The physical signs were those of tubercular disease of the left apex; viz., some dulness and deficient respiration, with crepitation and increased vocal resonance There was, however, no febrile disturbance; and the pulse, at first, was not quickened, but extremely feeble, and the man's chief complaint was of extreme debility; there was no dysphagia, nor indeed any local symptoms except such as were connected with the apex of the left lung. The extent of dulness was not great, and was most marked beneath the sternal end and above the left clavicle. The augmentation of vocal resonance was considerable; but, taking into consideration its seat, in immediate proximity to the trachea, was not at all remarkable. Fine crepitation, mixed with loose mucous *râles*, was very distinct, and the respiratory murmur, which was deficient, had a harsh bron-

chial character. The constitutional condition, however, was, to say the least, unusual, viewing the case as one of phthisis, and convinced me that there was something more than I could discover to account for it. Especially was I struck with the man's extreme debility, his apathetic manner, his remarkably small, feeble, and infrequent pulse. I could not elicit any history of previous ailment, nor admission of any local pain or functional derangement, though he had considerable anorexia. I was disposed to infer that he was under the influence of some great moral depression. There was no dyspnœa, and the cough was insignificant. A few days after his admission he had profuse hæmoptysis; and immediately succeeding thereto, insufferably fetid breath and expectoration, and manifest signs of a gangrenous cavity. He became exceedingly exhausted, and after again vomiting a large quantity of blood, sunk and died. The evidence of gangrene of the lung appeared to explain, in some measure, the extreme prostration which was the most marked general symptom; and I was certainly not prepared for what was revealed by the *post-mortem* examination.

Post-mortem examination, September 21st.—

Body pale and emaciated. In the upper part of the posterior mediastinum, and extending into the neck, was an irregular mass of somewhat soft cancerous growth, situated chiefly on the left side, firmly adherent to the bodies of the vertebræ behind, and communicating with the œsophagus by an extensive ulcerated surface which looked black and sloughy. The left side of the cancerous mass pressed against the left pleura; and here, at the apex of the left lung, was a gangrenous cavity formed between the lung and the pleura by destruction of the lung-substance, and limited by surrounding pleuritic adhesions. The cavity was nearly as broad as the palm of the hand; contained pulpy, fetid, semifluid matter, apparently *débris* of lung-tissue, and exhibiting, on microscopical examination, a quantity of granular and amorphous matter, but few or no cells. The cancerous mass, however, abounded in cells of various irregular, roundish, or fusiform shape, with nuclei. The remainder of the upper lobe of the left lung was in a state of grey hepatisation, soft, and easily breaking down. Portions of the lower lobe were also consolidated. The right lung was healthy, except a slight degree of emphy-

sema at the anterior part. The trachea was not implicated by the cancer. The heart was small, valves and cavities normal, but the muscular substance was undergoing fatty degeneration. The aorta presented a few patches of atheroma. The lower part of the œsophagus and the stomach were distended by several pounds of blood, chiefly coagulated. The part of the œsophagus below the cancerous mass, as well as the stomach and intestines, were free from cancer. The remaining organs were essentially healthy.

In this case it is evident that the disease commenced in a mediastinal growth, and that the lung became subsequently involved not by extension of cancerous growth, but by surrounding inflammation and destruction of tissue consequent thereon. The case, therefore, affords an illustration of the remarkable tendency there is in mediastinal or other tumours of a cancerous nature outside the lung to set up inflammation in the adjacent lung-tissues, and pleura, whilst, as a rule, there is little if any similar tendency in cancerous deposits in the lungs themselves to involve the surrounding parts in any such inflammatory changes. Nor, in the present in-

stance, was there any evidence to justify the opinion that pressure, either on the vessels or nerves, had any influence in inducing the destructive changes in the adjacent lung; nor have such results in other instances appeared to me to hold any clear relation to the amount of pressure on either nerves or vessels.

Death by hæmorrhage, as a consequence of cancer of the lung, is very rare. The amount lost in the case just detailed was considerable, and was, even during life, evidently due to breaking down of the lung. But in a case recorded by Dr. Church,* the hæmorrhage partook so much of the character seen in connection with aneurism, that it was supposed to be due to that cause.

A man aged 39 was admitted into St. Bartholomew's Hospital with symptoms of intrathoracic tumour, the nature of which could not be decided, but was supposed to be aneurismal, the leading symptoms being dyspnœa and convulsive cough, and recurring attacks of hæmoptysis; death eventually ensuing after the bringing up of about four pints of blood. An irregularly shaped mass occupied the anterior

* 'Path. Trans.,' vol. xix, p. 64.

mediastinum and encroached on the right lung. The right bronchus was much compressed and contracted, and the right pulmonary artery surrounded, but its coats not involved. The mucous membrane at the point of contact was much congested, and the adjacent lung-tissue broken down. There was a small clot of blood in the midst of the broken-down tissue. A considerable quantity of blood was found in the bronchi; but the actual vessel, or vessels, through which the hæmorrhage had taken place, was not discovered. No large branch of the pulmonary artery had given way.

In one of Dr. Pollock's cases at the Brompton Hospital,* the hæmorrhage partook more of the character seen in phthisis. The physical signs closely resembled those of phthisis, of which disease both parents had died. The first attack of hæmoptysis took place sixteen months before death, when the blood was black and clotted; but on the subsequent frequent recurrences, it was fluid and florid. The general symptoms also corresponded with those of phthisis; viz., dyspnœa, cough, with white thick expectoration, night-sweats, emaciation, and anorexia. The

* 'Path. Trans.,' vol. xix, p. 75.

case appears to have been one affecting the bronchial glands in the first place, thence invading the left lung, and, to a slight extent, the right. Both lungs were also consolidated beyond the cancerous mass to a considerable extent by cancerous pneumonia. The general symptoms were probably due, in a measure, to this complication.

Slight hæmoptysis in the early stages of pulmonary cancer has been often noticed; indeed, in many cases, has been the earliest symptom; and there is some reason to think that, as in phthisis, so also in cancer, copious hæmoptysis may take place in a stage prior to the actual existence of cancerous deposits. Generally, the first attack of hæmorrhage, from the giving way of an aneurism, dates from no long time prior to the fatal attack, although in some rare instances—as in Dr. Gairdner's case—the interval has extended to years. I find several examples of hæmoptysis from cancer preceding death more than a year.

In two other instances in which I have met with gangrene of the lung associated with cancer, it was quite evident that neither pressure on the nerves nor interrupted circulation had

anything to do with the gangrene. In one of these, there were in the right apex two small intercommunicating cavities together about the size of a filbert, filled with stinking puriform fluid, and surrounded by solid slightly indurated tissue of a greenish gangrenous hue, which yielded a yellow creamy juice on pressure, showing, under the microscope, the characters of cancer. The case was that of a man who died of cancer of the pylorus, and no other disease existed in the lungs, except a little emphysema and a few puckerings connected with old induration of the surrounding lung-tissue. In the other case, which I saw with Mr. Middleton,* a man aged 27, there was extensive gangrene of the lower lobe of the right lung, the upper lobes being healthy, with the exception of a little emphysema. The opposite lung was entirely solidified, the upper portion being a mass of cancer. The left bronchus was obliterated, and the large vessels on this side pressed on; but those of the right (the gangrenous) side and the corresponding tubes were quite free.

There is, however, no doubt that stagnation of blood in the ultimate venous radicles is very

* 'Path. Trans.,' vol. iii, p. 55.

apt to occur in connection with the cancerous cachexia; and it is believed by many that the secondary cancerous nodules of the lungs generally occur in this way. It is easy, therefore, to understand how, in an enfeebled cachectic state, complete loss of vitality may thus occur in the surrounding tissue, and so gangrene. This tendeucy to obliteration of the capillaries and the formation of fibrinous deposits, is well illustrated by the following case.

Case 5.—*Cancer of stomach and liver, fibrinous deposits in lungs.*—A man, aged 47, came under my care suffering from malignant disease of the stomach and liver, and sank rapidly, exhausted by cancerous cachexia. The lungs were found generally congested and œdematous, the upper lobes being somewhat emphysematous. In the margin of the lower lobe of the left lung there was a small whitish mass, having very much the aspect of cancer. A few old adhesions existed in the right pleura, in the cavity of which were about three quarters of a pint of serum. The right lung was covered by a layer of recent lymph, but the lung itself was crepitant throughout, and not so congested or œde-

matous as the left; the anterior margin was emphysematous. In the anterior lower portion of the upper lobe there was a solid mass, nearly as large as a hen's egg, varying in colour from a brick-red to gray, abruptly margined, and presenting a rim of gray substance; it was non-crepitant, and studded with black deposit. Like the surrounding lung-substance, it was of some degree of toughness, but broke down readily. The bronchial tubes were healthy, the smaller ones containing much mucus. The heart and pericardium were healthy; but on the aortic valve there was a growth of the size of a small hazel-nut, soft and elastic to the touch; on section toughish, and which yielded no juice on pressure. There were also a few small whitish masses in the substance of the musculi papillares. Some softening clots were attached to the chordæ tendineæ. About the tricuspid valve there were similar growths to those on the aortic valve. The liver was thickly studded with cancerous growths, yielding creamy juice on pressure. The stomach presented an ulcer of some extent in the cardiac end, and was much implicated by cancerous disease. The spleen presented patches similar

to those in the lung. Careful examination by the microscope rendered it doubtful whether any of these patches in the spleen, and the large mass in the lungs, were anything more than fibrinous patches; but the growths in the stomach and liver were distinctly cancerous. The masses connected with the valves of the heart were softening clots.

The more usual way in which cavities in the lungs result from cancerous disease is by the degeneration and breaking down of encephaloid masses; and, as might be anticipated, the symptoms and physical signs in such cases closely resemble those of phthisis. An example of this has been recorded by Dr. Peacock,* which is of remarkable interest, not only from the close resemblance it presented to phthisis, and from some special features, but also from its duration. For if we assume the disease to have commenced with the first attack of hæmoptysis, it lasted fully eighteen months; and this is a much longer period than most of the recorded cases of pulmonary cancer. This patient was a man 38 years of age, whose illness began with hæmoptysis. Subsequently he expectorated

* 'Trans. Path. Soc.,' vol. x.

casts of fibrinous-looking material from the bronchi. On examining the chest, there was considerable want of expansion, and deficiency of resonance on percussion, in each subclavicular region, especially on the right side, where irregular crepitation and bronchial respiration were audible. He subsequently complained of dyspnœa, cough and expectoration, and thoracic pains, especially of the left side. He lay with most ease on the right side. His appetite was defective, and he had epigastric pain and diarrhœa. The case was assumed to be one of chronic phthisis. Subsequently the face became puffy, and general anasarca followed, the urine being devoid of albumen. A month later he was seized with severe dyspnœa, pain and dulness in the lower part of the left side, where mucous and subcrepitant rhonchus were heard. The dropsy subsided, but the face continued swollen, and he gradually sank and died.

Both lungs were found to be firmly adherent to the parietes; the left alone was removed, which was voluminous. The upper part contained numerous anfractuous cavities; and in the lower portion there was much solidification, with collections of pus. In the anterior portion

there were several masses of whitish yellow-coloured deposit, resembling medullary sarcoma —some as large as a hen's egg. The right lung was less extensively diseased, and other organs were healthy. The diseased tissue from the lung was examined microscopically by Dr. Bristowe, and found to be degenerating encephaloid matter, and corresponded to the results of the examination of the expectorated masses.

It is not, however, only when there is evidence of breaking down of the lung that the physical signs, as well as the general symptoms, closely resemble those of phthisis. There is not infrequently limited flattening and altered form of the chest, in connection both with the early stages of mediastinal tumours and of deposits in the substance of the lungs, without any breaking down of the lung, which is very apt to mislead. This is well illustrated by a case of Sir Thomas Watson's, recorded by Dr. Ogle in the 'Transactions of the Pathological Society' for 1865. The patient was a lady, twenty or twenty-two years of age, who had been four years married, and had one child. She had had cough for some time, and latterly this had been worse; and she had been troubled with pains,

apparently rheumatic or neuralgic, across the chest, impeding at times her breathing. There was no expectoration; but much wasting and night-sweats existed. The chest, which had been full and expanded, was unsymmetrical, the left side being visibly flattened. On that side, subclavicular dulness on percussion existed; also coarse respiration, with some moist sounds and vocal resonance. On the right side behind, in the upper part of the lung, there was tubular blowing on expiration. The cough was most troublesome when the patient lay on the left side. The case was regarded as one of tubercular phthisis; and the patient went to Cannes, where she died soon after her arrival. On *post-mortem* examination, the pleuræ and pericardium were filled with serum, and the anterior mediastinum occupied by a dense white mass, involving all the great vessels. The substance of the lungs and the walls of the heart also, in many parts throughout their entire thickness, especially in the case of the auricles, were infiltrated by nodules and diffused deposits of medullary cancer. The lymphatic glands at the base of the heart and at the root of the lungs were especially the seat of morbid deposit, which also

predominated in the course of the vessels, although neither the calibre of the vessels nor that of the air-passages was interfered with.

In many other cases on record, a limited falling in of the thoracic parietes below the clavicle, associated with equally limited signs of solidification, has led to the belief that phthisis was the cause.

My next case is an example of cancer affecting both the lungs themselves and the mediastinum, in which the physical signs were at first limited to the apices, and resembled those of phthisis, but subsequently became associated with signs of pressure and spasmodic symptoms, indicative of serious implication of the nerve-trunks. The account which the patient gave of her previous history, and of having lost two members of her family from consumption, tended to confirm the diagnosis that was first made, of limited tubercular disease of the lungs.

Case 6.—*Cancer of bronchial glands, right apex, &c.*—Eliz. Spall, aged 49, a married woman, who had had a family, of spare habit of body, looking much older than the age she gave herself, was admitted under my care at St.

Thomas's Hospital on July 16th, 1869. She had a depressed and suffering expression of countenance, was of dark complexion, but not very unhealthy aspect. She stated that for five or six months she had suffered from cough and shortness of breath, attended with loss of appetite and of flesh, and considerable debility. These symptoms had become much more marked during the last six weeks. Her parents, she said, had been healthy, and lived to a good age; but she had lost a brother and sister of consumption.

The chest was somewhat flattened beneath both clavicles, and the percussion resonance on the right was somewhat greater than on the left. The respiration in the right apex was very harsh and bronchial in character, especially behind; and there was increased vocal resonance. Some rhonchus and coarse mucous crepitation were heard in both apices, and a little here and there throughout the chest; but the principal auscultatory phenomena were confined to the right apex. Her cough was very troublesome, occurring in paroxysms, and attended by expectoration, for the most part thin, but containing also masses of muco-purulent

matter, and occasionally streaked with blood. She complained of pain and general uneasiness throughout the chest. There was considerable anorexia and general debility. The bowels were constipated; the circulation quiet and feeble.

Ten days after admission, there was a considerable amount of dyspnœa, or sense of breathlessness, even when quiet; and the least exertion put her very much out of breath. Paroxysms of extreme orthopnœa and distress then became frequent, compelling her to retain the upright posture; and distinct laryngeal stridor attended the breathing. On August 2nd, metallic resonance on coughing, and loud tubular breathing, could be heard over the right apex behind. The expectoration at this time was more copious, but of the same character. It was at this time inferred that she had some intrathoracic growth, probably malignant. She had lost much flesh since admission, and was extremely exhausted, with a small feeble pulse. Stimulants and opiates gave a certain amount of relief; but she sank, apparently from exhaustion occasioned by the extreme dyspnœa and incessant paroxysms of cough, on August 22nd.

Post-mortem examination, August 23rd.—Brain and its membranes healthy. Larynx healthy. Trachea and bronchi much congested and greatly compressed by a morbid growth around them; they contained a good deal of mucopurulent matter. The lungs were swollen and large, and in the substance of each were several masses of encephaloid cancer. The upper lobe of the right lung was, however, the principal seat of disease, a considerable portion being in a softened and completely disintegrated condition. Much of the surrounding lung-tissue was consolidated, and the lower lobe of each lung was congested. The upper lobes of each lung were adherent to the costal pleura by firm and apparently old adhesions. The greater part of the mediastinal space was occupied by a mass of rather hard cancerous infiltration, involving the bronchial glands, and compressing the trachea, bronchi, and large vessels and nerves. The pericardium contained from six to eight ounces of turbid serum. The parietal layer was thickened here and there, and the seat of cancerous infiltration, especially near the root of the lungs. The heart weighed twelve and a half ounces, and its muscular structure was

flabby. The walls of the aorta contained several small cancerous deposits. The microscopical examination of the mediastinal growth revealed well-marked cancerous characters, the greater part of the cell-forms having more or less of a fusiform shape.

In this instance, the disintegration of lung-structure appeared to have resulted from the softening and breaking up of the infiltrated cancerous matter, the original seat of which was probably in the bronchial glands, and not, as in the case of Browne (previously detailed), from gangrene of the lung, notwithstanding that in this instance the symptoms during life, as well as the *post-mortem* signs, showed great and extensive pressure on both nerves and vessels. Nor were there in the present case any of those evidences of paralysis of the bronchial tubes which often lead to remarkable ulterior changes, and of which I shall be able to afford an illustration subsequently.

The dyspnœa and general distress were in this instance considerable, but only during the last two or three weeks of life. These symptoms depended, probably, on the amount of pressure on both nerves and vessels; for in

other cases, where even the whole of one lung has been either destroyed or rendered useless, as in a case to be subsequently detailed, I have found little or no dyspnœa or distress attending the respiration when the patient has been quiet. There may be even a considerable amount of obstruction of the trachea from surrounding pressure, without the proportionate dyspnœa that might be expected. If, however, there be any considerable degree of pressure, or irritation of the recurrent laryngeal nerves, then, I believe, we have invariably a great amount of both dyspnœa and distress. So also, if the large veins are so implicated by the disease as to be exposed to varying degrees of pressure, we find varying degrees of dyspnœa corresponding to the varying amount of general pulmonary congestion thus induced. Accordingly, we find these symptoms most marked in cases where the bronchial glands are extensively implicated, and where the cancerous disease occupies the upper part of the mediastinum. The greatest amount of suffering I almost ever witnessed attended the next case I shall relate, in which great but varying degree of lividity of countenance was associated with extreme pain and dyspnœa,

protracted over a period of nearly three months. This case belongs, indeed, more properly to the third division of my subject; but I introduce it here.

CASE 7.—*Primary cancer of the bronchial glands, involving the great vessels, right bronchus, and recurrent nerves, but not the pneumogastric.*—S. Fielder, a married woman, aged 47, who had never borne children, stated that her health through life had been good (with the exception of having suffered from what she called bronchitis) up to March previous to her entrance into Victoria Park Hospital, August 28th, 1867. In the month of March she had again so-called bronchitis, which was attended by sharp pain in the right side; since then she had had gradually increasing dyspnœa, loss of flesh and cough. On her admission, she was in a state of wretched destitution, and apparently dying. She was of small stature and spare frame. Her dyspnœa was of the most extreme and urgent character; her face deeply livid, surface cold, and pulse scarcely perceptible. She rallied after a while, so as to be able to take nourishment and obtain a little rest. The least exertion or excitement

immediately induced cough and severe augmentation of her dyspnœa; and the thoracic parietes also were so extremely sensitive, that much physical examination was quite impossible. Her position in bed was generally semi-erect and bent forward; and it was observed that the right side of the neck was swollen; and that on coughing, or when under a paroxysm of dyspnœa, there was an immediate and great tumefaction of the supraclavicular regions, especially of the right side. The expectoration was at times copious, and generally frothy. From time to time, partial and very hasty examinations of the chest were instituted. On October 14th—*i. e.* a week after her admission—the following record was made. "Infraclavicular and supramammary regions of right side more prominent than the corresponding regions on the left. Superficial veins much distended, especially on the left side. Respiration heaving and abdominal, and accompanied by laryngeal stridor. Percussion-note dull under right clavicle, preternaturally sonorous under the left; and a corresponding difference in the suprascapular regions. Respiratory murmur wholly absent in upper portion of right lung, and nearly so in the left; but some noisy bronchial

breathing in both apices. Respiratory sounds wholly absent below the right scapula; where, however, the percussion-note is good. Puerile respiration towards the base of the left lung; nowhere any moist sounds. Dulness in whole of right supramammary region absolute, which also is more prominent than the left. Motion of right side impaired. No distension of intercostals. Heart's impulse felt *in situ*, and its sounds transmitted through the whole of right side. Breathing attended with much effort and distress, and considerable lividity of face." The diagnosis at this time was intrathoracic tumour, probably malignant.

A fortnight later the following note was made. "Both supraclavicular regions still more distended and protruding, having a soft elastic feel, and traversed by nodulated and distended veins. A considerably enlarged gland nearly over the sternal end of right clavicle; and smaller glands can be felt here and there in the neck. The tracheal stridor so masks every other sound, that auscultation elicits no reliable information, although air appears to enter the left lung, and the left side is for the most part quite resonant on percussion; but the dulness is absolute over

the whole of the right side. Heart apparently *in situ;* if anything, a little to the left. Dyspnœa very great, and great sensitiveness of the surface, especially on the right side; and the same remarkable increased swelling of the lower cervical region when coughing or in the least excited. Expectoration frothy, with a little glairy opaque mucus. (Diagnosis, malignant disease.)"

The patient remained in much the same state till the 20th of the month, the paroxysms of extreme dyspnœa and suffering becoming more frequent, and the face very livid. About this time the face, neck, and upper extremities became œdematous, and the lividity extreme. The pulse was almost imperceptible, and the surface cold; and she died about noon on the 21st.

Post-mortem examination.—There was considerable lividity and œdema of the face and upper extremities still remaining; but the fulness of the lower part of the neck was much less apparent than during life, though the enlarged glands were more distinct and more numerous than they appeared in life. On removing the sternum, a firm growth was discovered rising up from the anterior mediastinum, partially adherent

to the posterior surface of the sternum, and extending upwards as high as the attachment of the sterno-mastoid muscles, and laterally on the left side beyond the edge of the sternum, whilst on the right side it was firmly adherent to the ribs about their junction with the cartilages. The trachea occupied its normal position in the neck; but immediately behind the manubrium, where it became involved in the morbid growth, it was somewhat flattened and pushed towards the left. The thyroid gland occupied its normal position, and was not enlarged. The superficial veins of the neck were enlarged, and distended with blood. On either side there was a mass of enlarged glands (the largest about the size of a pigeon's egg), involving on the right side the great vessels and recurrent laryngeal nerve. The pneumogastric trunks, however, were not involved, although in contact with the masses. The heart was in its normal position; the left pleura perfectly free from adhesions; the right universally adherent from apex to base. The contents of the chest having been removed *en masse*, the growth was found to arise from the bronchial glands, completely investing the trachea and bronchi, except at their posterior aspect, the

trachea being flattened and somewhat twisted on itself. The right bronchus was much compressed and flattened, but pervious. The left bronchus, though somewhat flattened, was not nearly so much compressed as the right, and allowed free entrance of air. The morbid growth, with the trachea, bronchi, and larynx, weighed 1 lb. 3 oz. The right lung was greatly compressed, collapsed, and airless, sinking in water, and with the thickened pleura, weighed more than the left, which was somewhat emphysematous, but otherwise healthy. The visceral pleura of the right lung presented a number of small nodules, of about the size of a pea, of similar material to that of the morbid growth. The heart was firmly contracted, each ventricle containing a clot. There were no secondary deposits found in any of the other viscera.

It will be observed that, though the duration of the disease in this case extended over many months at least, and though the right lung was rendered entirely useless and the large vessels obstructed, yet, the pneumogastric nerves being unimplicated, as well as the pulmonary plexus, we had none of those disorganising changes in the lung which are so remarkable in other cases.

On the other hand, the recurrent nerves being involved, we had the characteristic distressing paroxysmal dyspnœa which formed so striking a feature in this poor woman's case. The very general pleuritic adhesion and thickening of the one side and the immunity of the other is difficult of explanation; for, though the morbid growth had extended principally towards the right, it crossed to the left of the sternum, and the large vessels of the left side were involved; so that we might naturally have looked for a corresponding implication of the left pleura in that inflammatory action which leads to adhesions. I am disposed to think that there had been some old pleuritic affection of the right side, independent of, or accidental to, the morbid growth. But, however this may be, the case shows how different may be the condition of the lung even in protracted cases, and how much the physical signs may thus be modified.

SECTION III.

MEDIASTINAL CANCEROUS TUMOURS.

In the third division of my subject, comprising mediastinal cancerous tumours, we find much greater diversity in the symptoms during life, and in the effects produced on the lungs and other contents of the thorax. The complications are greater and more numerous. The lungs may be invaded or not, and either with or without ulceration. The signs of pressure may be connected mainly either with the vessels or the nerves, or simply the bronchi. And with any of these signs and unquestionable evidence of intrathoracic tumour, there may still be considerable difficulty in deciding whether we have not to do with an aneurismal, or other tumour, rather than cancer. In many of these cases, although it may not be easy to lay down rules of diagnosis for the guidance of others, it is very easy for a good practised clinical observer to

decide on the real nature of the disease. But in other instances, this is very far from being the case. The coexistence of pleuritic effusion often adds greatly to the difficulties of diagnosis, as does also the early occlusion, in many cases, of the bronchi, by which all respiratory and vocal phenomena are prevented. The first illustration that I shall adduce may be regarded as a typical case. There was no difficulty in the diagnosis when first I examined the patient; and throughout, the phenomena corresponded with what might be anticipated from the increase of the growth. Nevertheless, in some of its features the case bore a strong resemblance to certain forms of aneurism.

Case 8.—*Mediastinal tumour invading the left lung.*—E. R—, aged 40, married, a small spare woman of healthy aspect, was admitted into St. Thomas's Hospital under the care of Dr. Bennett, on March 25th, 1856. She stated that she had always enjoyed good health till the beginning of the present illness; and particularly that she had never suffered from rheumatism in any form. About three months ago, she first experienced difficulty of breathing, which had

gradually increased, attended by a sense of constriction across the upper part of the sternum; and of some obstructing cause situated behind the trachea, interfering greatly with her swallowing. There was neither lividity nor swelling of the features, nor anything indicative of much pulmonary obstruction, although the colouration was rather deeper than usual. The breathing, however, was forced and heaving, and accompanied by loud and prolonged stridor. The voice was unaltered, and she spoke without any difficulty. She appeared to suffer much from the pain and constriction referred to the upper part of the sternum, although the face was not expressive of great anxiety. The dysphagia was such that she would not attempt to take anything but liquids, which she swallowed with difficulty. There was nothing abnormal observed in the external conformation of the thorax; nor any particular venous turgescence. There was complete dulness, on percussion, over the whole left antero-superior region of the chest, extending across to the right of the sternum. Posteriorly, the dulness, though not so great, extended to below the angle of the scapula. The tracheal stridor interfered greatly with any

examination of the respiratory sounds; but, from time to time, during the temporary subsidence of the stridor, the respiratory murmur, although feeble, could be heard over the whole right side, mixed, posteriorly, with mucous crepitation, especially towards the base of the lung. Over the whole of the right side, except towards the base of the lung, there was fair natural resonance on percussion; but scarcely any respiratory murmur could be heard on the left side; and what was heard was faint, distant, and bronchial. Pain and tenderness were complained of, on percussion, over the upper part of the sternum. There was a certain amount of cough, attended by gray, frothy mucous expectoration. The action of the heart was irregular and occasionally intermitting, but free from *bruit;* its impulse was great. The sphere of cardiac dulness was apparently much enlarged; but as the pulmonary dulness extended to the cardiac region, it was difficult to say whether it was referable to the heart or the lungs. The right radial pulse was stronger and fuller than the left, and both were irregular. The temperature was natural, and there was not the least indication of febrile disturb-

ance, nor of disease elsewhere than in the chest.

Such was her condition on her entrance into the hospital. Subsequently the dulness of the left posterior region of the thorax increased, with entire absence of all respiratory sounds, and of all vocal thrill. The dyspnœa increased with paroxysmal exacerbations of great distress. She lay frequently on the face, which posture appeared to give some relief, both to the dyspnœa and to the pain referred to the top of the sternum. The action of the heart continued forcible, and the dysphagia became extreme. The pulse, especially on the left side, was exceedingly feeble, and little or no pulsation could be detected in the large vessels of the neck. Slight temporary relief was afforded by a small cupping, by antispasmodics, and by morphia. She died on April 2nd, after prolonged and extreme agony and struggling for breath.

Post-mortem examination. — The left pleura contained a quart of clear serum. The left lung was very much reduced in size, the upper lobe being pale and œdematous to an extraordinary degree, but crepitant throughout; its bronchial tubes were pale, and filled with casts of trans-

parent, colourless, jelly-like mucus. The lower lobe was crepitant throughout its greater part, but much less œdematous than the upper. The tissue retained its natural tenacity, and on squeezing it, a considerable quantity of frothy, but puriform, fluid escaped. The contents of the bronchial tubes were semifluid, opaque, and puriform. The lung, towards its root, was adherent to a malignant tumour situated in the mediastinum; and the whole of the inner surface of the lower lobe was similarly attached. A layer of dense fibroid tissue was prolonged from the tumour a little way over the surface of the lung. The right lung and right pleura were perfectly healthy. The pericardium was healthy. The heart appeared rather larger than natural; but the ventricles were distended with partially coagulated blood, and the walls were thin. The valves were healthy. In the upper part of the anterior mediastinum, and corresponding to the position of the manubrium of the sternum, a somewhat lobulated growth was detected, which proved to be a portion of a malignant tumour, nearly as large as an ostrich's egg, seated chiefly in the posterior mediastinum, in the position of the root of the lungs. The mass was somewhat

irregular in shape, and lobulated on the surface. It extended from the origin of the great arteries of the neck above, to the diaphragm below; and laterally, from one lung to the other; the root of the left being much more involved than that of the right. The greater bulk of the growth was situated in the upper half of the mediastinum, behind the ascending arch. It completely surrounded the transverse arch, and the origins of the left common carotid and subclavian arteries, without however causing their obstruction. The right branch of the pulmonary artery was free; but the left was completely surrounded by the tumour, and its calibre greatly reduced. The trachea was pushed to the right side, and its lower part surrounded by the growth, excepting on the right side. The right bronchus was free; the left enveloped by the tumour, and its sides so compressed together as to be virtually obliterated. The descending arch and the thoracic aorta, in its whole length, were completely invested by the tumour. The right pneumogastric nerve and its recurrent branch were not interfered with; but it was evident that the left was involved, and probably destroyed,

though it was not traced through the tumour. The diseased mass was moulded on the anterior and left two thirds of the thoracic vertebræ. On section, the tumour was found to consist, for the most part, of a whitish, slightly translucent, and glistening material, yielding, on pressure, a creamy juice. It was abundantly studded, here and there, with a network of opaque buff-coloured streaks and spots; and presented, at some points, extravasations of blood, and in others blackish masses, apparently indicating its origin in the bronchial glands. The mass was prolonged, in an irregular lobulated form, for some distance into the substance of the left lung. The liver, spleen, intestines, pancreas, kidneys, and peritoneum, were all healthy. In the left ovary was a malignant tumour about the size of a marble; and in the right a cyst as large as a hen's egg, filled with transparent fluid, and its lining membrane studded with small warty growths.

In this case, the condition of the lung, on the affected side, is deserving of special notice. Notwithstanding the occlusion of the main bronchus, the destruction of the left pneumo-

gastric nerve, and the great obstruction of the corresponding branch of the pulmonary artery, the tissue of the lung had not undergone any great amount of change. It was compressed, œdematous, and to a great degree bloodless, but still retained its tenacity, and was to a considerable degree crepitant. The reverse conditions of lung are more often seen in connection with similar conditions of the nerves, and vessels, and bronchi, as will be shown in another case to be subsequently given. But, inasmuch as a considerable amount of fluid existed in the left pleural cavity, it is impossible to say how far the physical signs in the infero-posterior regions during life were modified by, or were dependent on, such effusion. So far as regarded the upper regions of the thorax, the evidence of a progressive tumour was unmistakable; nor did the difference in the radial pulses, or the obstructed circulation through the large vessels of the neck, shake my confidence that the symptoms were due to a malignant growth, and not to an aneurismal tumour.

In the following case the phenomena differed considerably from those of the preceding. The

subject was much younger, a girl in her twentieth year, and came under my observation at an earlier period, so that the thoracic symptoms could be traced from their first appearance through their various stages. At the onset the pulmonary symptoms were those of bronchial irritation, showing in the sequel that these symptoms are by no means characteristic of disseminated cancer alone, but may be the first evidence of mediastinal tumours.

Case 9.—*Cancer of anterior and posterior mediastinum, left lung, ovaries, &c.* May 25th, 1868, Mary Riley, aged 20, living at Brixton—a small but well-proportioned and well-nourished girl—was admitted into hospital complaining of swelling and pain of the abdomen. For five months the catamenia had not appeared, and for some time she had complained of pain of the belly. A pyriform tumour occupied the centre of the abdomen, firm and uniform to the touch, not tender, having a close resemblance to a uterus in the fifth or sixth month of pregnancy. The breasts were a little swollen and the areolæ rather dark. There was slight febrile disturbance, with a

little cough. She stated that a month ago she had what was called an attack of pleurisy, and fancied that she had taken cold. She was examined by Dr. Barnes in reference to supposed pregnancy; but the result of his examination still left this question in doubt. The tumour, however, he thought was connected with the uterus. It remained stationary in size and free from movement or pain and the catamenia did not return. The febrile symptoms assumed more of the character of a mild typhoid fever than anything else, but with more than ordinary bronchial complication. The chest was everywhere resonant on percussion. Behind, there was more or less bronchial rhonchus and crepitation, particularly on the left side and about the apex. The expectoration, which was thin mucus, was occasionally slightly tinged with blood; and it was suspected that she was phthisical. In the first week of June, the febrile symptoms had pretty well subsided; the tongue was clean and the appetite better; but the pulse was quick and the breathing a little short and frequent, and she still had slight cough. As the signs of bronchial irritation subsided, she complained of

more pain of the chest, and there were here and there on the left side limited friction-sounds; but she never made much complaint of any thing, and was always rather apathetic and quiet.

Towards the second week in June, there were signs of consolidation, or pressure, of the left lung, indicated by dulness and harsh and tubular breathing, and the following note was made on the 15th June. Signs of mucous irritation have almost entirely disappeared; but there is extensive dulness of the left apex and side. The respiration is nowhere entirely absent, but everywhere more or less harsh and blowing. Percussion-note in the left clavicular region is tympanitic when sharply and fully struck, and of a marked "cracked pot" character, so as to be readily demonstrable to bystanders; a slighter percussion gives a completely dull sound. The "cracked pot" sound is also elicited in the suprascapular region, where there is bronchophony and tubular breathing. Respiration in right lung peurile; a little bronchial behind. Heart's sounds transmitted through the whole left lung; pulse quick; appetite fair. She is prevented from

sleeping by the cough, which is accompanied by slight clear mucous expectoration. Face free from congestion, and not distressed; skin cool.

June 18th.—Complete dulness of left apex, both anteriorly and posteriorly; but the "cracked pot" sound has entirely gone. Respiration heard throughout the apex, but very faint and more or less tubular, attended here and there by a little deep-seated crepitation and clicking; a little superficial creaking of a pleuritic character over the mamma. Within the last two or three days a tumour has become visible at the base of the left sterno-cleido-mastoid muscle. Some, apparently transmitted, respiratory murmur is heard in the lower part of the left lung.

21st.—Dulness great over nearly the whole of the left side; but more or less bronchial breathing is to be heard in most parts. There is so little vocal fremitus on either side that any difference is not perceptible. There is to-day manifest and considerable displacement of the heart, which is beating in the epigastrium and with augmented sounds, and a systolic bruit heard along the sternum. The resonance

of the right side is still good, and the respiration everywhere peurile. Decubitus is now on the left side, breathing being difficult either on the back or on the right side. She, however, rests very fairly; says she feels better; the tongue is clean and appetite better.

28th.—Breathing evidently more difficult, though she considers herself much better. Large superficial veins, very distinct and distended, running over the front of the chest and side of the neck; heart beating forcibly in the epigastrium, and the breathing now attended by a distinct tracheal stridor. Respiration of right side more harsh and bronchial. At each inspiration the sternal extremity of the left first rib is thrown forward so as to give the appearance of a pulsating tumour. Pulse 140; skin cool; a little short, troublesome, but not distressing, cough.

July 2nd.—Pulse very small and frequent; skin cool; cough accompanied only by a little transparent mucus; great dulness throughout the left side; left suprascapular region elevated and rounded, and some pleuritic friction is heard there; heart beating violently under the xyphoid cartilage. She complains now of

shooting pain in the base of the left lung and in the neck.

5th.—Breathing forced and heaving, and croupy noise more distinct; and there is now some dulness under the right clavicle.

9th.—Died, having had several paroxysms of extreme dyspnœa and syncope.

The *post-mortem* examination revealed cancerous disease of the anterior and posterior mediastinum, of the left lung, and of the ovaries and mesenteric glands, with effusion into the pleura, and displacement of the heart. There were a few old and firm adhesions at the back of the left lung, and flakes of recent lymph elsewhere. The whole anterior mediastinum was occupied by a large, irregular, encephaloid growth, which above and to the left of the pericardium involved the anterior portion and root of the left lung. In front, the cancerous mass was also continuous with large globular masses, like enlarged glands, in the posterior mediastinum, having a similar encephaloid aspect. There was also an enlarged, similarly diseased gland, close to the origin of the left carotid artery. The outer portion of the left lung was free from cancer, but compressed and airless.

Towards the root, however, the cancerous deposit was continuous into the lung tissue, involving the bronchial tubes and the pulmonary vessels, which were pervious, but compressed, and their walls completely softened and infiltrated with cancer. The right lung was healthy and crepitant, excepting a small portion of the base which was compressed. The right bronchus was slightly encroached on by the cancer, which had infiltrated its walls to some extent. The pericardium contained a little serum. The heart was displaced, its base being pushed downwards and towards the right side, so that rather more than half of the organ was to the right of the median line. The valves were healthy; the right cavities contained some partially decolorised clot; the left auricle was encroached upon by the cancer, which formed a large, rounded tumour, causing a bulging of its posterior wall on the inside. Pharynx and œsophagus healthy; peritoneum healthy; liver slightly congested; spleen small, healthy; pancreas congested; stomach and intestines pushed forward and slightly distended with gas; mucous coat of the stomach softened. Solitary glands of the ileum and colon very prominent,

filled with a whitish substance. Mucous membrane of ascending colon congested. Mesenteric and lumbar glands formed a large mass of soft cancer, in some places semi-fluid. The kidneys were small, and their texture healthy. The bladder, also, was healthy.

The greater part of the pelvis was occupied by a large oval tumour, occupying the median line in front of the uterus. This tumour on removing the parts, was found to represent the left ovary, which had been converted into a mass of encephaloid cancer. Into the greater part of this tumour, hæmorrhage had taken place; so that on section a large portion of the tumour appeared to be made up of decolorised fibrine. The fimbriated extremity of the left Fallopian tube was also involved in an irregular cancerous mass. The right ovary formed a tumour of the size of an orange, infiltrated with cancer; the corresponding Fallopian tube was healthy. The uterus itself was healthy, and of the ordinary size of a multiparous uterus. Vagina healthy. The thyroid gland and suprarenal bodies were healthy. The body was not emaciated, and there was no œdema.

Some of the cancer from the lumbar glands

was examined microscopically, and the juice found to consist entirely of nuclei, mostly round, of the size and appearance of pus-corpuscles, but not acted on similarly by acetic acid; the more solid portion contained nucleated fibres, round and oval nuclei, and a few small fusiform corpuscles. The nuclei were rendered more distinct on the addition of acetic acid, and in some of them a nucleolus was visible.

This case presents many points of great clinical interest. As regards the signs of bronchial irritation and pleuritic inflammation, which were the chief symptoms referable to the chest, in the early stages of the disease, there was great difficulty in deciding to what cause they were attributable. The history which was obtained of the case, prior to her admission to the hospital, naturally raised the suspicion that the symptoms in question were due to tubercular disease; and her age and general appearance, and the occurrence of hæmorrhage, confirmed this suspicion. But the progress of the case and the depressed apathetic condition of the patient, led me to doubt whether the symptoms were not rather due to enteric fever, with more than usual bronchial complication,

although there was no eruption detected, nor any disturbance of the bowels. The abdominal tumour was supposed to be, in all probability, a fibroid tumour connected with the uterus, if it were not ovarian. As soon, however, as the signs of pulmonary consolidation made their appearance, associated with unmistakable evidence of excentric pressure, I had no longer any doubt of the real nature of the case, especially as with the supervention of these signs there was a remarkable subsidence and eventual disappearance of the signs of mucous irritation. The physical signs were unmistakably those of consolidation rather than of effusion. The disappearance of all signs of mucous irritation, and the non-occurrence of any evidence of ulceration, rendered it extremely improbable that the consolidation was due to tubercular deposition; and the history of the case, as well as the general symptoms at this time, contradicted the notion of pneumonic consolidation. It is difficult to explain the occurrence and subsequent entire disappearance of the tympanitic "cracked pot" sound. This phenomenon, it is well known, is not unfrequently met with in connection with consolidation of the apex, both from pneumonia

and pleurisy. The absence of vocal fremitus, the marked transmission of the heart's sounds throughout the lung, and the existence of an apparently pulsating tumour at the sternal end of the left first rib, are also very noteworthy. A little attention, however, soon proved that the apparent pulsation was a respiratory phenomenon, and was due to the partial dislocation and consequent movement of the end of the rib during respiration. In the later stages of the case there could be no reasonable doubt as to its real nature. The displacement of the heart; the distension of the superficial veins; the stridulous breathing; the extension of dulness across the upper part of the median line; the pain and forced respiration; and, finally, the appearance of external tumours at the base of the neck, all pointed to the existence of an intrathoracic tumour, and that probably of a malignant character.

The varieties in form, size, and precise situation, presented by mediastinal tumours, are very great and numerous. The particular anatomical relations of these growths, it is evident, will give to their symptoms corresponding varieties. Both the immediate and the ulterior consequences of

the pressure they exert, as well as the kind and amount of inflammatory action induced, differ greatly in different cases.

A small tumour may, from its particular site, at a very early stage give rise to symptoms both of pressure and deranged innervation of great severity; whilst another will attain to a considerable magnitude before the patient experiences any distress, or before any decided evidence of pressure is manifested. Thus dysphagia has been in some instances a very early symptom, and in others has been absent throughout; and the same may be said of dyspnœa, spasmodic action, and cough. The diagnosis, in so far as relates to the direct signs of tumour of some kind, may be often easily made, when it will be difficult or quite impossible to say what that tumour is. But the diagnosis between aneurism on the one hand or cancer on the other may be approximately arrived at, by careful consideration of other circumstances, especially of constitutional condition.

In the more advanced stages of intrathoracic cancer, there is nothing that presents greater difficulty in the diagnosis than the kind and degree of inflammatory action that supervenes,

and the existence or absence of effusion. Adhesions more or less general take place very early in some cases, and serous effusion is prevented; in others, there are few or no adhesions, and considerable effusion. Changes in the tissue of the lung, with varying degrees and forms of consolidation, are met with not infrequently; whilst in many others one or more lobes of the lung remain permeable to air up to a very late period. In no less than six of the thirty-nine cases that I have examined, there was copious effusion into the pleura. It is evident, therefore, that the mere fact of the existence of signs of effusion cannot be conclusive against the existence of cancer. But, on the other hand, it must be admitted that the physical signs of effusion are sometimes very closely simulated by a large cancerous tumour, where no effusion exists. Neither the form of the chest nor the state of the intercostals will be sufficient to protect us from error. I have met with one case in which the early history was that of recurring attacks of pleurisy, and where, subsequently, tenderness and a liquid impulse during cough over the most prominent part of the enlarged side so deceived the medical

attendant as to induce him to puncture the chest —convinced that the case was one of empyema of necessity. Time would not allow of my illustrating more than a few of the varieties and clinical puzzles that are presented by mediastinal tumours.

My colleague, Dr. Sutton, has furnished me with the details of a case that fell under his notice, which well illustrates the difficulty of diagnosis in some of those cases where the side is dilated by the magnitude of the internal growth.

A little girl, eleven years of age, was admitted into the London Hospital, supposed to be the subject of pleuritic effusion of the left side, and suffering from great dyspnœa, with lividity of countenance. There was absolute dulness throughout the left side, before and behind. In front, the respiration was inaudible, except under the clavicle. There was bronchial breathing close to the spine on the left side, where tactile vocal fremitus, which was elsewhere absent, could be perceived. The heart was displaced, and was felt beating to the right of the right nipple. The left side was bulged, and apparently enlarged. The epigastrium sank in

during inspiration. The temperature was normal; pulse variable; respirations from 32 to 36. The diagnosis was, *very great effusion into the left pleural cavity;* and the chest was twice punctured. The points chosen for puncture were between the eighth and ninth ribs, in front and behind the angles. A little dark blood issued on each occasion, and on the second occasion something like pus. The dyspnœa increased, and the child died on March 26th. Before making the *post-mortem* examination, Dr. Sutton found, on measurement, that just below the nipple the left side measured an inch more than the right; and so convinced was he of the existence of fluid, that he thrust in a trocar between the fifth and sixth ribs, when some brain-like substance escaped through the cannula. On laying open the thorax, the entire left side was found to be occupied by a mass of medullary cancer, which had pushed the heart considerably to the right. The left lung was collapsed and pushed backwards, and spread over the cancerous mass.

This patient was repeatedly examined by so accomplished an auscultator as Dr. H. Davies, as well as by others; and all came to the same

conclusion—that the chest was full of fluid. The case, therefore, sufficiently proves how very deceptive are the ordinary physical signs of effusion, when the side is distended by a large cancerous tumour. I believe that, in similar cases, importance may be attached to the peculiar sense of resistance under percussion which characterises a solid growth. This has sometimes been observed to a degree that has been painful to the finger under percussion. In cases of long standing, the persistence of great dyspnœa, associated with signs of pressure, will usually be in favour of a solid tumour, rather than of effusion.

There is another point of some importance in connection with such cases as, from their history, are liable to mislead on this point of pleuritic effusion; viz. that effusion probably does occur to some extent, is absorbed, and adhesions take place long before the growth has attained sufficient size to distend the chest; whilst in others effusion of a more passive character only occurs late in the disease, long after undoubted signs of pressure have existed. In these latter cases, if they have been watched for any time, it will be found that the dulness has

extended from above downwards, rather than from below upwards, except in some very exceptional instances, where the growth has invaded the lower lobes of the lung in the first instance. I need not say that but little assistance can be expected from any modification in the phenomena produced by alteration of position.

In the following case the difficulty in diagnosis in the early stages arose mainly from the very unusual condition of lung, induced by interrupted circulation and consequent extreme hæmoptoic congestion.

Case 10.—"*Medullary sarcoma of mediastinum; consolidated left lung from extreme mechanical congestion; cancer of liver.*—A much esteemed medical practitioner, æt. 60, of spare habits, always somewhat delicate, and having slight lateral curvature of the spine; had passed through an active life without any severe illness. His father died early, but it is not known of what disease. His mother lived to a great age, being blind for some years before her death. Several brothers died in the West Indies, it is believed of climatic diseases."

"The Christmas preceding his death he had an attack of so-called pleuro-pneumonia of left base, since which he had had difficulty of breathing, but he became worse towards the end of January, having, as he believed, taken fresh cold, and having had a good deal of pain in the præcordial and left lateral regions of the chest. When first seen by me he was the subject of considerable persistent dyspnœa, aggravated from time to time in paroxysms. He had also cough, coming on in fits, unrelieved by any amount of expectoration, but followed by slight spitting of glairy, clear, frothy mucus, in which there were, not unfrequently, specks and streaks of blood, and sometimes small pellets of blood of a bright colour. His face was not congested, but with a good deal of colour, showed more than an ordinary degree of capillary injection. This was to a certain extent natural to him. After an exhausting fit of coughing there would, however, be a certain amount of lividity, sometimes considerable. The skin was cool, and the pulse generally about 80; the tongue coated and furred, but moist. His appetite was tolerably good, but needing care, or he suffered from indigestion. The bowels were sluggish, requiring

the aid of a compound rhubarb pill, or a simple enema. He had not lost much flesh, but was unable to move about much, owing to breathlessness on exertion. In bed he required to have the head and shoulders elevated. The temperature in the axilla was scarcely above the normal degree."

"On proceeding to examine the chest, I found the right side somewhat larger than the left, but as he was the subject of slight lateral curvature of the spine to the right, I was disposed to consider this inequality as unconnected with his present disease. The whole of the right side was resonant on percussion, and respiration was everywhere audible, and somewhat rough and noisy. The left anterior chest was also fairly resonant on percussion, but the respiratory sounds were feeble in the apex, and accompanied with some wheezing, as though there might be some emphysema. The left infero-lateral and posterior regions were dull on percussion, and little or no respiration could be heard. About the angle of the left scapula there was distinct bronchial breathing; but there were few or no râles, except of the dry character. He complained of pain in the præcordial region, and to the left thereof, and was under the

impression that he had some disease of the heart. The heart's action, however, was natural, with the exception of an occasional intermission, which he said was not a new thing. The sounds were free from bruit, and so far as I could ascertain there was no evidence of aortic disease. The only diagnosis that I could form either at this or subsequent visits, was that he had some consolidation of the base of the left lung, probably the result of the so-called inflammatory attack before Christmas, with possibly some effusion. The amount of dyspnœa was, however, much more than corresponded to the evidence of pneumonic consolidation, and the fits of harrassing cough led me to imagine that there might be also some localised empyema seeking to obtain exit through the bronchi. The pain and sense of oppression about the left præcordia were distinctly relieved, more than once, by small blisters, and his breathing and sense of exhaustion were alleviated by an antispasmodic mixture, containing æther and compound tincture of camphor, with a little soda; but this and alcoholic stimulants, which he took for the same purpose, after a time seemed to excite some feverishness, and he was advised to try

small doses (ten minims) of antimonial wine as an expectorant and febrifuge. He was, however, so depressed by this, though at first relieved in his breathing, that he was obliged to abandon it. The tongue, however, became cleaner and less furred, and his appetite improved; but his debility increased, and an ordinary action of the bowels often greatly exhausted him. The cough continued to recur in distressing and exhausting unrelieving paroxysms, attended by the same kind of expectoration, viz. clear, glairy, frothy mucus, with a varying amount of blood. The least movement put him greatly out of breath."

"After some weeks it was evident that the left lung was becoming more and more consolidated, and there was less and less respiration to be heard behind, with persistence of tubular breathing, and bronchophony about the angle of the scapula. The respiration in the right lung continued puerile and harsh; but he complained less of pain in the side, which at length disappeared. The diagnosis I now formed was 'intrathoracic growth.'"

"In the beginning of May full light was shed on the true nature of the case, after a careful

examination of the chest, when the following were the physical signs clearly made out. The left side was flattened and contracted, the infra-clavicular region being much sunken. The dulness was complete throughout. Tubular breathing and bronchophony were heard, as previously, about the angle of the scapula. There was no tactile fremitus detectable on the left side, but this was well marked over the right, which now appeared much larger than the left. The left supra-clavicular region was puffy and distended, and some enlarged glands were distinctly felt. His breathing, which was more than ever heaving and difficult, was attended by a tracheal stridor, not very loud or harsh, but very distinct. The superficial veins of the chest became distended, especially about the clavicle; the face was more livid, and the upper extremities, especially the hands, became œdematous, the right more so than the left. The expectoration sometimes consisted purely of fluid blood, at other times of clear mucus as formerly. The paroxysms of dyspnœa were attended by extreme exhaustion, and he feared the least bodily movement. A few days before his death the bleeding ceased, and his breathing

became less distressing, the tracheal stridor disappearing; but his exhaustion increased, and the arms became more œdematous. The physical signs remained much the same, but the whole left side was dull on percussion from apex to base. He sank exhausted on the morning of 27th May, having had a certain amount of diarrhœa for a few days, but retaining his intellectual powers to the last. Emaciation, though not to a great extent, had taken place during the last few weeks of his life."

"*Post-mortem thirty hours after death.*—The forearms were œdematous, the face sunken, and the left side of the chest dull throughout. On removing the sternum the pleural cavity of the left side was found to contain ten or twelve ounces of clear fluid, of the colour of brown sherry, and void of any flocculi of lymph, or of blood. On removing this fluid the lung was seen presenting a remarkable appearance, having more the external aspect of an enlarged lobulated spleen, and to the touch having the firm solid feel of that organ. The edge of the lower lobe was bound to the costal pleura at one spot by a narrow band of rather firm adhesions; a similar rather broader band of still

firmer and evidently old adhesions bound the outer edge of the apex of the lung in like manner to the side. The whole lung was also adherent to the spine and posterior part of the thorax. A large, irregular tumour occupied the upper part of the left pleural cavity, extending from just above the level of the first rib to the level of the third rib, and stretching across obliquely to the right of the sternum. On the right side the growth extended barely to the level of the second rib, the upper portion being overlapped to a great extent by the lung, but passing down behind the spine. On the left side the growth extended along the greater part of the mediastinum, and the whole mass surrounded and involved the trachea and large vessels, so that on removing the contents of the thorax *en masse* the trachea was seen, when cut through, of an elliptical shape, running through the centre of the solid mass. The whole growth was of an irregular lobulated shape, softish and elastic to the touch, and when cut into presented, in a very characteristic degree, the appearances of medullary sarcoma, yielding an abundance of thick creamy fluid; in some parts being quite pulpy, in others less so,

and presenting a vascular variegated aspect. There was no opportunity for tracing minutely the relations of the mass to the different vessels and nerves, which, however, it was evident must all have been, more or less, involved in the growth."

"The right lung was voluminous and healthy, but much gorged with fluid, and adherent by the extreme apex to the pleura, and to the diseased mass which had slightly invaded the pulmonary tissue at one point. The right pleural cavity was healthy and contained scarcely any fluid, The left pleura was healthy, also with the slight exceptions mentioned. On examining the left lung it was found to be solid throughout from extreme congestion and effusion of blood. Large masses of so-called pulmonary apoplexy existing in several parts, especially in the lower lobe. It presented scarcely any trace of pulmonary tissue to the naked eye, was firm, not easily torn, and felt like an enlarged and somewhat hardened spleen. It was firmly bound down to the spine, and to the morbid growth; but, though much diminished in volume, was of sufficient size to occupy a considerable portion of the lower and posterior

parts of the pleural cavity. The larger bronchi were with difficulty traced, and the main bronchus was much compressed. The mucous membrane of the bronchi in both lungs, so far as could be ascertained, was healthy."

"The liver was rather small, and was thickly studded with white cancerous masses, most of them of a pulpy consistence. They existed both in the substance and on the surface of the organ. The kidneys were large and much congested. The spleen, small, misshapen, and atrophied, was of an unusually tough fibrous consistence. The heart was soft and flabby, its cavities dilated, its substance of a pale colour, having scarcely any of the appearance of muscular tissue, and the walls thin. The valves were healthy, as was also the aorta. No tubercles or cheesy deposits were found anywhere, nor was there any trace of old disease of the lungs, liver or heart."

The primary seat of disease in this case, there can be no doubt, was the mediastinum, the upper portion of which was probably first invaded, and the root of the left lung so early involved as to occasion great obstruction to both the main bronchi and the vessels. But the nutrition of

the lung does not appear to have been seriously interfered with, and therefore we may conclude that its nervous supply was not seriously interrupted. Great engorgement was probably early induced before much effusion into the pleura took place, so that pressure from the pleuritic effusion which subsequently took place did not exert its usual effect in reducing the size of the lung, it being previously rendered to a great extent solid. A greater degree of general and hæmoptoic engorgement I have rarely seen, unattended by the least evidence of inflammatory action. That the pleuritic effusion was of comparatively recent occurrence seems also to be shown by the considerable collapse and falling in of the whole of the left side which existed. During life there was no distinct obliteration of the intercostal spaces, and though vocal fremitus was diminished or lost there was more bronchial breathing about the angle of the scapula than was consistent with the supposition that much fluid existed in the chest. Neither was there any evidence of displacement of the heart. The præcordial pain of which the sufferer chiefly complained must have been due to nervous communication, and

symptomatic only of the disease in the upper mediastinum. Various opinions had been given of the nature of the case, and it had been considered at different periods as aortic disease, emphysema, chronic pneumonic consolidation, and phthisis. By the patient himself it was considered that the heart was the principal seat of disease.

The *differential diagnosis between aneurism and malignant tumours* is sometimes beset with difficulties. Dr. Sibson, in his 'Croonian Lectures,' has ably illustrated the principles of diagnosis in the several varieties of intrathoracic aneurism, especially pointing out the definite direction which different aneurismal tumours take in the course of their development. But we have no such aids to guide us in the case of mediastinal tumours; on the contrary, there is the utmost diversity, not only in the original situation of the growths as regards their anatomical relations, but also in the direction which they take in the course of their development. A distended state of the superficial veins is, no doubt, a more frequent attendant on the interrupted circulation through the internal veins, occasioned by cancerous disease. But this is

not always present, as several of my cases show; and, when present, it is usually in the later stages, and associated with growths of considerable magnitude. The main difficulties in diagnosis are, however, in the early stages of aneurism, and in cases of small limited cancerous tumours, before they have involved to any important extent surrounding textures. And it is in the early periods that an accurate diagnosis is of most importance as regards treatment; for it is then that we may hope—in the case of aneurism at least—that therapeutic efforts may be of some avail.

Pain is a very common symptom of intra-thoracic cancer in some stage or other of its progress; but it is not usually severe, nor is it of any special character. In at least half of my cases it was an early symptom, and generally had been of a pleuritic, sometimes more of a neuralgic or rheumatic, character. In many of these it had been of very temporary duration. In more than one instance it was sudden, sharp, and transitory, and attendant on physical exertion. Most frequently it was referred to the side, in other instances to the shoulder or the sternum. In two instances it was severe, long

continued, and associated with acute sensitiveness of the thoracic parietes. When severe, it is, I believe, the result of extensive pressure and implication of the nervous trunks. But I have seen extensive tumours involving the nervous trunks and large vessels unattended by pain throughout the course of the disease. Speaking generally, I believe that pain is a more prominent and severe symptom in connection with aneurism than with intrathoracic cancer. Pain in parts distant from the thorax is rarely observed; and symptomatic vomiting has been chiefly noticed in cases where the cardiac nerves have been implicated.

Dr. Little, in the 'Dublin Journal,' has described a very interesting case, forcibly illustrating the difficulty of diagnosis between aneurism and intrathoracic cancer, the only sign revealed by auscultation when the patient was first examined being diminished respiratory murmur in the left lung. Hæmoptysis had occurred a year previously, and the principal symptoms were dysphagia, aphonia, a constant tickling cough attended by sanguineous mucous expectoration, wandering pains about the chest, and especially a pain in the left side between

the spine and the scapula. Subsequently there was dulness in the front of the chest spreading to the *left* of the sternum, and not to the right as is usually the case with an aortic aneurism making its way to the front. But there was neither impulse nor arterial sound over the dull region. Doubts as to the real nature of the case subsequently arose, especially from the fact of non-relief from the application of leeches, on which Dr. Little is disposed to lay great stress. Doubtless in most cases of aneurism making their way to the front, local depletions do very generally give more or less temporary relief; but I have in several instances found that much relief has been obtained by the same means in intra-thoracic cancer.*

Some bulging in the subclavicular or upper sternal region not infrequently occurs in the progress of intra-thoracic growths, and may be associated with both pulsation and murmur; and in these respects may resemble aneurism, but I need not point out the well-known peculiarities of an aneurismal tumour by which, with a little care, it may be distinguished from other

* Vide also Dr. Church's case in 'Trans. Path. Soc.,' vol. xix, p. 64.

tumours. The existence of a cardiac or aortic bruit, irrespective of any signs of tumour, has, however, sometimes proved a source of doubt in the early stages of deep-seated cancerous disease at the root of the lungs.

A marked distinction between the progress of an intra-thoracic aneurism and cancer is the well-known tendency of the former to produce *absorption of bone and external tumour*. Dr. Stokes says that he has seen no instance of cancer of the mediastinum inducing either one or the other; nor have I met with any instance of absorption of bone. But of external tumours, thus induced, I have met with several instances. Mr. Holmes,* however, records a case in which both external tumour and absorption of bone resulted from the outward growth of a malignant mediastinal tumour. The man, twenty-three years of age, was a patient of Dr. Pitman, and was admitted with a tumour presenting towards the *right* of the upper part of the sternum, which felt almost solid, and pulsated strongly. No aneurismal *bruit* could be detected; but a systolic murmur was heard over the tumour and at the base of the heart. The

* 'Trans. Path. Soc.,' vol. ix.

pulse was full and bounding, and there was an inequality in the successive beats at the right wrist. The man was stout and of florid complexion, and had had hæmoptysis. It was found, after death, that the tumour had completely absorbed the sternum in many places.

In a case recorded by Dr. Pollock,* a tumour appeared in the suspicious situation of the second intercostal space, hard, exquisitely tender, and the seat of lancinating pains. There was also irregularity of the two radials as well as of the pupils. I could also quote other cases, besides one of my own to be detailed subsequently, in which distinct external tumours and limited protrusions of the thoracic parietes have been met with.

The *spinal column* is not infrequently invaded by intra-thoracic cancer, though seldom to the extent seen in the case next to be detailed; and here it was accompanied by an external tumour in the dorsal region. My friend Dr. Stone has also related to me the case of a lady who, having for some time had a small scirrhus tumour of the mamma, gradually became paraplegic. The auscultatory phenomena for a long time gave no

* 'Trans. Path. Soc.,' vol. xiv.

indications of thoracic disease; but a tumour made its appearance between the scapulæ, which was the seat of much pain and tenderness. Ultimately, there was a systolic murmur; and signs of pressure on the heart and aorta supervened. After death, the lungs and heart were found to be pressed forward against the sternum, and the aorta flattened by enlargement of the bodies of three of the dorsal vertebræ, which was converted into a tapioca-like mass by colloid cancer. The interscapular tumour was produced by enlargement of these vertebræ, the seat of colloid cancer—a form of cancer very rarely met with in the spinal column.

But though after death we not infrequently find either the ribs or spinal column or both implicated in the cancerous disease, I have myself met with but two cases where evidence existed, during life, of such complication. In one instance the disease of the spinal column had extended to the theca of the cord, but not through it, and, pressing on the cord itself, induced symptoms of progressive paralysis. In the other, the cord itself showed evidence of inflammatory changes. The true nature of the disease was diagnosed from an

early period in the former case, although in certain important respects the symptoms deviated from those which are most characteristic of extensive cancerous disease of the chest, especially in the absence of dyspnœa. And although the earliest symptoms were such as would naturally lead to the suspicion of phthisis viz. hæmoptysis to the extent of several ounces, cough, and expectoration, with emaciation and night-sweats, the subsequent progress was not that of phthisis. The temperature, also, which was noted from time to time, being below the normal standard, seemed conclusive against progressive tuberculisation.

A *low temperature* may, indeed, usually be considered to characterise cancer; but, from a case which has recently occurred in the London Hospital, it would appear that increase of temperature may attend the rapid growth of cancer diffused through the system. A man with cancerous disease of the testis became the subject of acute symptoms, referable to the lungs, there having been loss of flesh and spitting of blood for three weeks previously. The physical signs showed that mischief was going on, diffused through both lungs. After death, deposits

of carcinoma were found in various parts of the brain, liver, lungs, and testis. There was, however, no evidence of acute inflammatory changes in any part of the body; no pneumonia, nephritis, or serous inflammation, and the brain-substance was healthy; but the cancerous deposits were exceedingly vascular, and had the character of having rapidly grown. The high temperature in this case ranging from 100 to 101·4 deg., led to the inference that the changes going on in the lungs were of the class known as tubercle, or broncho-pneumonic phthisis. The body was very carefully examined by Dr. Sutton, who satisfied himself that if any inflammatory mischief had been going on it was inappreciable: we therefore can only infer that the high temperature was due to the rapid growth of cancer; *i. e.* rapid cell formation.

In the following case, the absence of constitutional disturbance was remarkable, and the disease, though extensive, was of comparatively slow growth.

Case 11.—"*Intra-thoracic cancer, involving the bronchial glands, spinal column, etc., occluding the left bronchus, and converting the left lung into*

a series of abscesses.—A. K—, aged 23, single, a servant girl, was admitted into the Victoria Park Hospital, under the care of Dr. Risdon Bennett, on the 29th of October, 1867. She was a well-grown girl, rather spare, with brown hair and eyes; and, except that she was rather pale, of a healthy aspect, that did not indicate any very serious disease. She did not give a very distinct or satisfactory account of any previous illness; but stated that, whilst away for her holiday at Whitsuntide, she had felt very unwell and out of sorts. Previously to that time, her health had been very good. After a month's absence, she returned to town, feeling much better, and went to service. In about a fortnight, however, she broke down; the catamenia became suppressed; she had hæmoptysis to the extent of three or four ounces, with some cough and expectoration; the latter, however, was but scanty. She lost flesh and strength, and had night-sweats."

"On her admission, the following were the physical signs that presented themselves on examination. The thorax was well formed. There was absolute dulness over the left anterior region of the chest; absence of respiration, and no in-

creased vocal resonance; nor much, if any, diminution of motion. The heart-sounds were a little ringing in character, and audible throughout the whole of the left side. The pulse was feeble, and under 100; the tongue was clean; the breathing was calm and perfectly easy, and continued so; there was a little occasional cough with slight, simple, mucous expectoration. She was feeble, and somewhat put out of breath in walking. Her appetite was good, and there was no febrile disturbance."

"On the 15th November, she complained, for the first time, of pain between the shoulders, which was relieved by a small blister. On the 22nd November, the following record was made of a very careful physical examination. 'Heart-sounds heard more distinctly to the right than to the left of the sternum; very little impulse to be felt or seen; but this is most appreciable by the touch, immediately to the left of the sternum, an inch above the nipple; sounds audible throughout the chest; dulness absolute throughout the left side; respiration altogether inaudible, except it be at the extreme base posteriorly, where faint, questionable, and probably transmitted, breath-sounds may be detected.

In the same situation, the dulness is also somewhat less marked; diminished motion; no vocal thrill. On the posterior aspect, the left side appears less prominent than the right; and it is found by measurement to be half an inch less from the sternum to the spinous processes. Anteriorly, the dulness terminates abruptly at the mesian line of the sternum.'"

"On the 6th December, the following note was made. Within the last fortnight, she has gradually lost power in the lower extremities; this is most marked in the left leg, where it was first noticed. She also complains of numbness, which has gradually extended upwards as far as the epigastrium. There is some difficulty in passing urine, but no incontinence, nor any paralysis of the sphincter ani. There is still some pain, though less than at one time, over the dorsal vertebræ, with tenderness on percussion. Her countenance is placid, and even cheerful in expression; scarcely any cough or expectoration, and the most remarkable absence of dyspnœa, except when moved. The tongue is clean; the appetite fairly good; pulse feeble, usually under 100; temperature in the axilla, 98·5°."

"On the 18th December, the paralytic symptoms were more pronounced, and the belly tympanitic; profuse sweating; some epigastric uneasiness, and diminished appetite; urine 1·022, acid, scanty, and slightly albuminous; temperature 97 deg.; breathing still quite placid; heart's action more superficial, and attended by a questionable friction-sound. On the 20th, some twitching and starting of the lower limbs; sphincters still good; respirations, 24 per minute; temperature, 97 deg. On the 27th, paralysis had involved the upper extremities, and the urine was passed involuntarily. A large slough had formed on the back. The tongue had become glazed and dry. The heart was displaced upwards, and there was a slight systolic murmur at the apex."

"On the 3rd January, there was observed, for the first time, a projection of the third lumbar vertebra. Breathing rather short and quick, and pulse rapid and scarcely to be felt. On the 5th, for the first time, there was much dyspnœa, with mucous rhonchi and dusky countenance, and she appeared to be sinking. She, however, rallied; the breathing became comparatively tranquil; and she did not finally

sink till the 12th of January, when she died apparently from asthenia."

"*Post-mortem examination.*—The body was much wasted, well proportioned, and the chest well-developed; the lower extremities œdematous. The heart was found displaced, being drawn upwards. On opening the pericardium, the posterior wall was seen to be thrust forward by a grayish-white mass near its base. The left pleura was greatly thickened and adherent throughout. The right pleura had here and there a few scattered adhesions. The left lung was somewhat, but not greatly, reduced in volume, and converted into a number of small abscesses or cavities, for the most part about the size of a Spanish nut and filled with thick greenish-yellow pus. The cavities showed no lining membrane, their walls being formed by ragged lung-tissue. There was nowhere any healthy lung-tissue detectable. What looked like the remains of lung-tissue was of a greyish colour, dotted with pigment, resembling gray hepatisation, and of that consistence throughout. On passing the finger down the trachea to the bifurcation, the right bronchus was found to be patent and normal. The left bronchus was

completely occluded by the surrounding mass of malignant structure in which the bronchial glands were involved. On laying open the bronchus at the occluded spot, it was found to be pressed on by the malignant growth all round; and below this point the growth had so invaded the walls of the bronchus, that its channel could no farther be traced. The main portion of the growth lay in front of the descending aorta and œsophagus, but did not invade their coats. Below the bifurcation of the trachea it formed a large mass, which completely surrounded the left bronchus, but passed across the right bronchus without either involving or surrounding it, and terminated just before reaching the root of the right lung. It thus lay below the arch of the aorta. Backwards it extended between the left arches of the fourth and fifth dorsal vertebræ and between the roots of the corresponding ribs on both sides. It extended also in some places four or five inches from the bodies of the vertebræ and involved the dorsal muscles. In the vicinity of the fourth and fifth vertebræ it invaded the spinal canal, compressing the cord and its sheath, both of which, however, were healthy. On each side of the

body of the third lumbar vertebra, the disease had also invaded the spinal canal. It could be traced likewise along the upper border of the pelvis, a little outside the left iliac vein. The iliac vessels, however, were not involved, nor were the glands on the right side of the chest, except just at the bifurcation of the trachea. The right lung weighed twenty ounces, was somewhat œdematous, and at the base showed a little red hepatization. The mucous membrane of the bronchial tubes was much congested, but they contained no pus. The heart was healthy, weighing nine ounces and a half. The liver weighed five pounds three ounces, and presented a marked example of the common "nutmeg liver," quite as marked as that seen in connexion with contracted mitral orifice. The gall-bladder was healthy, and also the spleen, which weighed eight ounces. The kidneys weighed seven ounces, and were much congested, being throughout of a dark red colour. The intestines were congested, but otherwise healthy, as were also the mesenteric and lumbar glands; nor was there any malignant deposit in any of the internal organs. The growth everywhere presented the same character, being

soft and of a grayish-white or white colour, and yielding, on pressure, an abundance of milky juice. This in many parts was so abundant as to pour out immediately on section of the growth."

The condition of the lung of the affected side is the main point of interest in this case, not only pathologically, but also with reference to diagnosis. The first effect of pressure on the left bronchus was doubtless a certain degree of collapse of the lung, and, as this proceeded, corresponding falling in of the parietes, subsequently increased by the general adhesions of the pleural surfaces. The diminished motion was only marked in the latter stages of the disease, when the adhesions had become firm and general. In proportion as the bronchus became occluded and the tubes became choked, we had absence of respiration and of vocal resonance, and complete dulness from consolidation of the lung. It is, therefore, obvious that we may have all these important physical signs, independent either of fluid effusion or a solid growth filling the chest; for the mediastinal growth in this instance extended but little beyond the sides of the spinal column. Doubtless, the anterior

dulness depended on the solid growth ; but that of the lateral and more distant parts of the chest must be referred to the collapsed and consolidated lung. The only remaining question would be, might not the consolidation of the lung be the result of pneumonia? It seems very improbable that such an error would be committed, if only the least attention were paid to the history and other features of a similar case. But how, it may be asked, was this consolidation and extensive disintegration of the lung induced? Simple impediment to the entrance of air would not produce it. Dr. Stokes appears to think that, both in aneurism and in the case of cancerous tumours, gangrene of a portion of the lung may ensue from pressure on a main bronchus, owing to the anatomical disposition of the nutritive arteries of the lung, as pointed out by Dr. McDonnell. This seems highly probable, and, *primâ facie*, a sufficient explanation. But I am disposed to think that, where such disintegration as existed in this case occurs, the true explanation is that which has been given by Dr. Gull, who refers the lung-changes to pressure, not so much on the principal arteries or even nerve-trunks, as on the

sympathetic plexus at the root of the lung. Certain it is that physiological experiments, especially those of Reid and Pavy, show that division of *one* pneumogastric nerve does not lead to any morbid structural change in the corresponding lung; and there are numerous cases on record, both of aneurism and of cancerous tumours, where the pneumogastric has been involved to the extent of destroying its continuity, without any such structural changes resulting as were seen in the case last detailed. The ordinary result of mere occlusion of a bronchus is simply collapse of the corresponding lung. If, however, before their occlusion, the bronchi and capillaries become paralysed, owing to such pressure and disease at the root of the lung as deprive it of nervous supply from *all branches* of the pulmonary plexus, whether of the direct or interlacing branches, then we have such paralysis of the tubes as incapacitates them for emptying themselves of their contents; and the exudation from the congested capillaries accumulates, and hepatization and purulent infiltration follow. And this is precisely what seems to have resulted in the case in question, where the whole lung became converted into

an airless solid mass, riddled by cavities. Where a similar condition exists to only a limited degree, involving one lobe or portion of a lobe, we have sometimes complete gangrene. These conditions, Dr. Gull has rightly said, are of considerable importance as aids to diagnosis when the physical signs, apart from the interpretation thus afforded, would be quite insufficient. It is exceedingly difficult to trace with sufficient minuteness the course of the nerves through a cancerous mass and the compact surrounding tissues, so as to ascertain their precise condition; and in any case this requires more time and care than can generally be afforded, so that the *post mortem* records are seldom given with the minuteness and accuracy that are necessary to give us the data requisite for determining the real nature of the changes which the lung has undergone. It is, however, certain that, with complete occlusion of the main bronchus, we find after death very various conditions of the corresponding lung.

There are at least three very distinct conditions of lung commonly met with in connexion with mediastinal growths.

1. A collapsed state, in which the lung is

airless, and diminished greatly in volume by pleuritic effusion, having apparently undergone no other change than that which is frequently seen in ordinary cases of pleurisy with effusion; and a closely analogous condition, where it is spread over and condensed on the surface of the morbid growth.

2. The condition described in the case last related, where the lung retains its volume to a considerable extent, but has become consolidated by inflammation, and then has undergone disintegrating changes, ending in the formation of abscesses or numerous pockets of pus—all communication with the main bronchus being destroyed.

3. An augmentation of volume, with more or less consolidation, either from inflammatory condensation, or from the extension of the cancerous growth into the substance of the lung.

These latter cases are generally associated with enlargement of the affected side, and often with increased vocal fremitus, tubular breathing &c., according as the main bronchus is or is not occluded.

A *fourth* very unusual, but quite distinct, con-

dition is that described in Case 10, where the lung retains considerable bulk, being solidified from extreme hæmoptoic congestion.

Although, as I have stated, the destruction of continuity of one pneumogastric nerve does not involve any structural change in the corresponding lung as a necessary consequence, it is certainly somewhat remarkable that we should not more frequently meet with symptomatic vomiting or other disturbance of the stomach. But, except where the cardiac plexus is involved, as in certain cases it is, where the heart becomes implicated, we do not meet with any such symptoms.

An interesting case, however, is recorded by Dr. Quain,* in which the function of the stomach was completely suspended, owing to the impossibility of swallowing any food—the patient dying of inanition; and where, after death, both vagi nerves presented a remarkable morbid condition, referred by the narrator to the results of "reflex irritation." In this case, the œsophagus was imbedded in a cancerous growth for nearly four inches of its course; the leading symptoms during life having been a

* 'Path. Soc. Trans.,' vol. xix, p. 75.

complete inability to swallow, scarcely any food appearing to pass into the stomach, and the patient complaining much of hunger and intense thirst. The right vagus entered the upper part of the tumour, and soon became completely imbedded in it, and throughout its whole course presented a remarkable fusiform enlargement. The left vagus presented a similar condition; its entrance into the tumour, and coincident enlargement, beginning a little below, where the recurrent was given off. Under the microscope, the bulbous enlargement was found to consist of a basis of coarse granular matter, with irregular scattered fine fibres of fibrous tissue. That this bulbous enlargement of the vagi was not due to pressure, seemed to be shown by the state of other nerves, more deeply pressed on by the tumour, which showed no such enlargement.

As a general rule, cancer invading the *spinal column* does not extend through the meninges and infect the cord, nor even induce inflammatory changes in the nervous substance. The cord itself was not implicated in the case of the young woman just detailed. In the following case, however, inflammatory softening of the

cord resulted from the cancerous disease of the vertebræ and meninges. This case, moreover, is remarkable from the early age of the patient, a boy eleven years old; and from the wide diffusion of cancer through the system.

Case 12.—"*Encephaloid cancer of lungs, spinal canal, &c.*—April, 1864. G. C—, a lad, aged 11, of rather pale and delicate aspect for a country boy, stated, when admitted into St. Thomas's Hospital, that he had never had any illness, and that a week ago he was at work in the fields with his father. On returning home, he complained of pain in his back and loins, and was unable to walk or even stand. On questioning him, he said that the pain of his back was now gone, but he had lost the use of his lower extremities. Sensation was also diminished. The sphincters were impaired; and the bladder was now enormously distended, the urine having dribbled away for some days before admission. The skin was warm; pulse quickened; tongue slightly furred and coated. He was ordered a purgative, a saline diaphoretic mixture, and hot wet blankets, with the use of the catheter at regular intervals. Two days after admission,

he had some power of motion of the right leg, but none of the left. The left leg and thigh were swollen and œdematous. There was also some œdema over the dorsum towards the middle, but no tenderness or pain along the whole course of the spine. He did not make any complaint of pain. There was no twitching or other spasmodic action. He slept well after the use of the blanket, in which he sweated freely. Pulse 100, soft; tongue not dry, but somewhat furred. He took food well. The breathing was quiet. He had no cough. The urine was pale, exalbuminous, and free from sugar."

"A day or two after this, enlarged glands were observed in the groin. The œdema of the left extremity and of the back continued. He had regained some power of the sphincter ani, but none of the bladder. The secretion of urine continued free. On April 11th he lay on the left side, and had some numbness of the left arm. The leg was much swollen, and there was a superficial sore of the sacrum. A month later —viz. May 13th—there was œdema of the abdominal integuments of the left side, as well as of the leg; and there was some enlargement

of the veins, as well as tenderness. On June 9th—a month later—he had become very anæmic. The hypochondria were dilated and tense. There were some nodules on the sternum, and deep depressions of the ribs on each side. The abdomen was swollen and tympanitic. The liver, however, could not be felt below the ribs. The respiration was quiet, and could be heard quite low down. There was no dyspnœa, cough, or other pulmonary symptoms. The heart was *in situ*. There was considerable distention of the superficial veins. He did not appear to be suffering much in any way, and took his food tolerably well. He died June 23rd."

"*Autopsy*.—The body was extremely emaciated and the skin pale. The inferior extremities and the lower part of the trunk were highly anasarcous, the left leg being rather more swollen than the right. The brain and its membranes were quite healthy. The muscles of the back contained several masses of white soft cancer, apparently taking the place of the muscular tissue on either side of the dorsal spines. The anterior part of the vertebral canal contained similar growths, extending from the middle dorsal region downwards to the sacrum,

in front of, and somewhat adherent to, the anterior surface of the dura mater. The internal surface of the dura mater and the surface of the spinal cord appeared healthy; but, on microscopic examination of the tissue of the cord, that of the middle dorsal region was found to contain numerous spherical granule-corpuscles; and many of the nerve-cells seemed granular, as if in process of conversion into granule-corpuscles. The tissues of the cervical and lower dorsal portions of the cord appeared healthy. There was a collection of turbid brownish fluid in the left pleura, and some shreds of lymph were loosely adherent to the left lung. The pleuræ and the lungs contained numerous masses of white soft cancer, varying in size from an egg down to the smallest visible particles projecting from the surface of the pleuræ. Many similar masses were found in the anterior and posterior mediastinal spaces and in front of the lumbar vertebræ, forming a continuous series from the neck to the sacrum. The cancer was white, and all more or less soft and juicy, some masses appearing quite soft and creamy in the centre. Some of the masses in the lungs involved portions of the bronchial

tubes—without, however, rendering them impervious; the affected portions of the tube being quite white and opaque. The heart and its valves appeared healthy. The pericardium presented old cellular adhesions. The liver was much enlarged and somewhat fatty. The spleen was also very large; but neither of these viscera contained any cancer. The right kidney was large and somewhat congested, weighing six ounces. The left kidney was small, weighing three ounces; its cortical substance was inflamed and partially destroyed by pressure from within outwards, the pelvis and the upper portion of the ureter being distended with urine. Near the bladder, the ureter was completely occluded by a mass of encephaloid, apparently springing from the outer surface of the bladder on the left side, and occupying a great part of the cavity of the pelvis, considerably compressing the rectum. The right ureter was pervious; the bladder contracted, its walls thick; mucous membrane apparently healthy. The suprarenal bodies and pancreas appeared healthy, The stomach and intestines also seemed healthy, except that the colon was much distended with solid fæcal

matter; the sigmoid flexure especially forming a large pouch, which projected forwards above the bladder and pubes. There were several enlarged glands in the groin, converted into masses of soft cancer, and pressing on the iliac veins, which were filled with adherent brownish-coloured clot. The glands in the left groin were especially enlarged; and on this side the obstruction to the venous circulation extended rather higher up, and was more complete."

There are, I believe, very few cases on record in which the *heart* has been the seat of cancer, except as associated with the same disease of the lungs or mediastinum. It is not, however, very rare to find the pericardium and heart invaded by the progress of cancer commencing in other parts of the thoracic cavity. We have seen that it may be pressed on and displaced by mediastinal growths, and its action thus seriously deranged. It is not, therefore, remarkable that we should frequently meet with cardiac *bruits* and modifications of rhythm and impulse in connexion with various forms of intrathoracic cancer. This should be borne in mind in obscure cases, where there may be any question as to the existence of aneurism. It has in

several instances been found to mislead, when the real cause of signs of pressure has not been ascertained. I have not myself met with an instance in which the cancer was confined to the heart. A few years ago, however, Bricheteau published a very interesting case in which the heart alone was the seat of disease within the thorax, but associated with similar disease of the ovaries. The cardiac affection was not suspected during life; the patient, a girl aged 24, having been admitted with slight signs of pleuropneumonia, which subsided. When apparently going on well, the pulse suddenly rose to 156 or 160; and the sphygmographic tracing showed a series of curves, without any line of ascent. The heart's sounds continued normal, and the patient complained only of a feeling of weakness and oppression. She had no palpitation. On the morning of the last visit paid, she seemed better, and the pulse had fallen to 140. Two hours afterwards, when trying to reach a morsel of sugar from the stand by the bedside, she fell back and died. On opening the thorax numerous pleuritic adhesions were discovered. The pericardium contained a little serum, and the heart rested in it perpendicularly.

The left ventricle was of a yellow colour, and presented numerous irregularities of surface. Its muscular fibres were almost completely destroyed, and replaced by irregular yellowish masses, firm, and projecting from the surface. On scraping these masses, they yielded a yellowish cancerous juice. They extended into the posterior wall of the right ventricle, and into the right auricle, as well as into the inter-ventricular septum. In the interior of the left ventricle there were numerous smooth and round vegetations. The right ovary presented the appearance of a white mass of considerable weight and consistence. The microscope showed the cancerous nature of the masses, and a fatty state of that portion of the muscular structure of the heart which was not replaced by cancer. Other organs were healthy.

Dr. Sutton has favoured me with the details of a very rare case, in which the heart was the primary seat of the intra-thoracic cancer, but had become infected by the extension of disease through the parietes of the chest, from scirrhus of the mamma. A lady, fifty-three years of age, was suffering from a tumour in the left breast, which was considered by an eminent surgeon to

be scirrhus. This tumour apparently ceased to grow; but the patient's health continued impaired, and by degrees her breathing became affected, and she complained of much breathlessness on exertion. On examining the chest, the lungs were found to be somewhat emphysematous; but there was no evidence of bronchitis, and the small amount of emphysema seemed quite inadequate to account for the breathlessness. The heart's action was regular, and there was no increase of the cardiac dulness. The first sound of the heart was very feeble, but unattended by any murmur. The lady gradually lost flesh, particularly of the extremities; complained of pain about her chest; and the cardiac region became very tender on percussion. The shortness of breath increased, and frequent nausea and occasional vomiting supervened. The feeling of sickness increased so as to be most distressing night and day. The respiration became much accelerated. Nothing relieved the nausea, except very temporarily; and the patient sank. After death the tumour of the mamma proved to be scirrhus. It had penetrated through the intercostal muscle by a narrow pedicle, and involved the peri-

cardium, forming at the root of the heart a tumour of the size of a small orange. This tumour surrounded the pulmonary artery and aorta, the innominate and left carotid and subclavian arteries, running along the outer coats, but not, apparently, diminishing the channel of those vessels, The growth also extended down towards the apex and into the anterior wall of the right ventricle. The heart weighed about five ounces; it was apparently much atrophied. The lungs were emphysematous, but otherwise healthy. With the exception of a fibrous tumour in the uterus, the other organs were healthy."

Neither of these cases, I think, helps us much in determining the symptoms and diagnosis of cancer of the heart. Increase of dyspnœa, pain, palpitation, faintness, and vomiting appear, from a comparison of other cases with those which I have given, to have been the most prominent symptoms; and of those symptoms, faintness and vomiting or nausea have been most frequently noticed. When the valvular apparatus has been the seat of cancerous deposits, deranged rhythm and morbid *bruits* have been of course not infrequently noted.

SECTION IV.

NON-CANCEROUS INTRA-THORACIC GROWTHS.

MEDIASTINAL and other intra-thoracic growths are occasionally met with which are not of cancerous nature, but which, during life, are not easily distinguished from cancer. Scrofulous enlargement of the bronchial glands, hydatid disease, enlargement of the thymus and thyroid glands, have all been mistaken for cancer.

It is highly probable that some cancerous mediastinal tumours have originated in a persistent thymus gland, the principal mass having precisely the anatomical relations that might be expected in simple enlargement of that body; but inasmuch as all traces of the normal structure of the thymus are usually wanting, it can seldom be affirmed with any confidence that the cancerous disease originated in the gland.

Since the date of Dr. Hodgkin's paper on that peculiar form of disease of the lymphatic glands and spleen to which his name has been given, there have been numerous cases recorded in which considerable tumours have been found occupying the situation of the thymus, and associated with enlargement of the lymphatic glands, as well as with those appearances in the spleen described by that distinguished pathologist. Such mediastinal tumours have presented the same characters of structure as the enlarged glands, and have not shown the ordinary characters of cancer. Their clinical history also has been different, in many cases remarkably so.

The following very interesting example is the only one that has fallen under my own observation ; and that it is referable to the class of cases designated by the terms lymph adenoma, lympho-sarcoma, or Hodgkin's disease, will, I think, not be questioned.

Case 13.—*Lymph adenoma of the anterior mediastinum ; enlarged lymphatic glands, &c. ; Hodgkin's disease.*—" Elizabeth H—, æt. 17, a spare, delicate-looking girl, height 5 ft. $1\frac{1}{2}$ in.,

weight 6 st. 2 lbs., was admitted into the Victoria Park Hospital under my care, January 7th, 1871. Her mother is said to have died of 'decline and heart disease.' Father is living and in good health. She has eight brothers and sisters living and in good health. One sister died, æt. 22, of 'fits,' and a brother, æt. 3, 'of inflammation of the chest.' "

Previous history.—She states that up to twelve months ago her health was good, and that she never had rheumatism or epistaxis. The catamenia, however, have not yet appeared, nor are the mammæ developed. About a year ago she says that she caught cold from wet feet, after which she had cough, attended by a good deal of expectoration mixed with some blood. The cough continued, but was better in the summer. A month ago she was obliged to give up her place as a servant, in consequence of the shortness of her breath, which for nine months has been gradually becoming worse. Latterly she has had some nocturnal perspirations, and for three or four months has been losing flesh. A fortnight before admission she had some diarrhœa. There has been no swelling of the feet.

Present state.—Face thin; complexion fair and delicate; expression dull and apathetic; emaciated. Some sudamina on the chest and abdomen, but no rose-coloured spots. Tongue tolerably clean, but dry; much thirst; appetite tolerable; bowels regular; some cough, which, however, is not very troublesome. Breathing short, especially on the least exertion. Decubitus chiefly to the right; expectoration scanty, consisting of white glairy matter mixed with some pigment. Pulse 140; resp. 36; temp. p.m. 102·5. Some sweating at night, but sleeps pretty well. Urine scanty, loaded with lithates, but free from albumen or sugar. Thorax fairly well developed, but on viewing it anteriorly is much rounded in lower sternal region which is much more prominent than natural. Respiratory movements forced and heaving, the whole chest moving "en masse," with but little natural expansion of the ribs. The superficial veins are somewhat dilated, especially about the left shoulder. Just above the left clavicle there is an enlarged gland, which, she states, has been there since childhood. The whole central anterior portion of the chest is absolutely dull on percussion, and the dulness extends rather

more towards the right than to the left side. Under the clavicles and towards the angles of the ribs the resonance is good, and perfectly good in the lateral and posterior regions. The sphere of anterior dulness is of a pyramidal shape, the apex extending full half way up the manubrium of the sternum. The cardiac impulse is most distinctly felt and seen in the epigastrium low down. The sounds of the heart are indistinct, but heard in the natural situation, and rather lower than usual. No abnormal bruit can be detected. Over the whole region of anterior dulness there is entire absence of all respiratory sounds. In the right lateral region some creaking and rubbing sounds can be heard, both during inspiration and expiration; on the left side this is less marked. Respiration may be heard in both infra-clavicular regions and throughout the posterior region of the thorax, and in the axillary regions. It is, however, everywhere somewhat shallow, and mixed throughout with more or less sonorous, sibilant, and mucous râles. Tactile fremitus can be perceived under the clavicles and behind, and feebly in the lateral bases. The intercostal spaces are fairly well marked when viewed from

behind. The liver is enlarged, extending below the ribs, and there is a tumour in the left lower hypochondriac region apparently from splenic enlargement.

She was evidently a good deal distressed in her breathing, and the cough frequently came on in exhausting paroxysms, but was unattended by much expectoration. She complained of a certain amount of pain in the sternal and lateral regions, and frequently lay to the right and on her face, or sat up in bed bent forward, resting on her knees. At times she would be somewhat cheerful, but usually was taciturn and took but little notice, apparently absorbed by her general distress and difficulty of breathing. The heart's action was often very rapid but never irregular, and she sometimes complained of tenderness on pressure by the hand or the stethoscope over the cardiac region.

The temperature, respirations, and pulse were regularly noted during the whole time of her residence in the hospital, and generally the observations were made both night and morning. The temperature ranged from 104·2 on the 20th March to 96·8, the lowest, on the 27th January. Usually, however, the range was

from 100 to 102. The pulse ranged from 108 the lowest to 160 the highest; and the respirations from 24 the lowest to 48 the highest. See table subjoined.

The physical signs never varied in character during her whole illness, but there was very considerable variation in the extent and intensity of the signs of bronchial and pleuritic irritation and of the febrile disturbance, general distress, and difficulty of breathing. The central sternal dulness steadily increased, though not rapidly. From first to last there were no signs of displacement (except as regards the situation of the apex beat of the heart) or of local pressure either on the bronchi or trachea or large vessels. Immediately before death, however, there was a certain amount of œdema of the lower extremities and of the right hand, on which she lay a good deal. Nor was there any lividity of features till immediately antecedent to her death.

A marked relation existed between the signs of bronchial irritation, pain, external tenderness, and distress of breathing, and the range of temperature, pulse, and respirations. Thus, during the month of January, *i.e.* for the first three weeks after her admission, the signs of

serous and mucous irritation were very extensive and various, and the temperature ranged from 100·4 to 103·7, the pulse from 136 to 160, the respiration from 36 to 48.

On the 23rd January she was reported as much relieved. The thoracic symptoms were much less marked, she had scarcely any wheezing and comparatively few bronchial râles, much less pain and tenderness of the præcordia, and general distress, took her food better, and was altogether distinctly improved in her general condition. At this date the temp. was 96·8, pulse 136, respirations 30. This improvement continued for some time, and at this period the splenic enlargement could not be felt.

On the 22nd of February she is reported as worse again; she had again lost her appetite, the wheezing and râles, especially on the right side, were very general, the breathing was much more distressed, the anterior dulness appeared to be extending, she had profuse sweating, and the temp. rose to 103·3, the pulse to 140, the respirations 36 to 38. Of these changes in her condition she experienced several, at intervals of a week or ten days.

In the beginning of March she was much

better, but towards the end of the month she had again relapsed. The breath became very short and the cough very troublesome; she also, at this time, became very drowsy and took very little food, she lay quite over on her face to the right; loud, sibilant, and mucous râles were heard throughout the chest except over the region of the anterior dulness, where alone there was any marked deficiency of percussion resonance.

There was but little attempted in the way of treatment. She took, with some apparent advantage, effervescing salines with small doses of digitalis, and sometimes a little nitrate of potash. She did not appear to bear anything in the shape of tonic, but was relieved from time to time by an opiate or ether and soda mixture, by the external use of belladonna, mustard poultices, and once or twice by small blisterings with the liquor vesicatorius.

Her diet consisted principally of milk, jelly, beef tea, with a little wine or brandy and eggs.

The following table records the range of temperature, pulse, and respirations at successive periods:

Date.		Temperature.	Pulse.	Respiration.
January 11	p.m.	102·5	148	36
„ 12	a.m.	103·7	132	40
„ „	p.m.	103·5	152	36
„ 13	a.m.	100·8	140	36
„ „	p.m.	103·0	144	40
„ 14	a.m.	103·2	152	36
„ „	p.m.	102·1	146	40
„ 15	a.m.	102·7	150	44
„ „	p.m.	102·8	...	...
„ 16	a.m.	102·4	140	48
„ „	p.m.	102·8	150	42
„ 17	a.m.	103·2	...	...
„ „	p.m.	102·0	136	38
„ 18	a.m.	101·2	132	44
„ „	p.m.	103·3	160	40
„ 19	a.m.	101·7	...	...
„ „	p.m.	102·6	144	40
„ 20	a.m.	101·5	132	36
„ „	p.m.	101·4	136	44
„ 21	a.m.	100·5	140	36
„ „	p.m.	100·4	124	32
„ 22	a.m.	98·5	...	...
„ „	p.m.	101·8	136	40
„ 23	a.m.	97·6	136	38
„ 24	a.m.	96·8	136	30
„ 25	a.m.	98·4	...	...
„ 26	a.m.	97·6	128	30
„ 27	a.m.	97·2	128	28
„ „	p.m.	96·8	130	32
„ 28	p.m.	99·7	124	30
„ 29	p.m.	98·1	132	24
„ 30	p.m.	98·4	...	...
February 22	p.m.	103·3	140	36
„ 23	a.m.	102·4	140	28
„ „	p.m.	103·2	140	36
„ 24	a.m.	102·6	128	30

Date.		Temperature.	Pulse.	Respiration.
February 24	p.m.	102·0	128	36
„ 26	p.m.	100·7	108	32
„ 27	a.m.	100·7	108	32
„ 28	a.m.	100·5	116	32

March. The temperature and pulse fell again during the early part of this month, and she was altogether much more comfortable.

The autopsy and microscopical examination were conducted by Dr. H. G. Sutton.—The body was much wasted. The lower extremities were moderately œdematous.

On raising the sternum its under surface was found firmly adherent over its upper third to a growth lying in the region of the thymus. This growth formed a large, firm, hard, solid mass; it was situated in front of the trachea and just above the base of the heart. It extended down in front of the pericardium to the diaphragm, and laterally to the anterior portion of each lung. When this mass was cut into from above downwards the portion lying over the pericardium was seen to be more than an inch thick, and this very thick portion extended nearly as high as the top of the sternum, and diminished in thickness as it extended downwards in front of the pericardium. This growth was attached to the outer surface of the pericardial sac, but

it had not invaded the bag of the pericardium, and this serous membrane was healthy. The growth extended on each side, as already mentioned, into the anterior portions of the lungs, so that the lung-tissue was in these situations converted into firm, tough, gray, solid tissue; the growth extended in some places about two inches into the lungs. It also extended backwards around the trachea, but it had not compressed the air-passages or the vessels at the root of the neck. The cut surface of the growth had a bluish-gray colour, and passing through it was some more opaque yellow tissue. The growth was very firm, tough, and yielded no distinct juice. The portion invading the lungs had similar characters. The aorta and pulmonary artery were uninvolved. The heart was normal. The two sides of the pleuræ were firmly united over the anterior parts of the lungs. See Plate II.

A section of the right lung from apex to base showed the following appearances. There were masses about the size of shillings lying amongst apparently healthy lung-tissue. Each mass was solid, moderately firm, and smooth, and had a bluish-gray appearance, was very circum-

scribed and separated from the surrounding lung-tissue. There was also a little dark pigment scattered in each mass. Also in this lung were several bodies about the size of large pins' heads, which were gray, firm, hard, tough; in appearance they looked like so-termed tubercle. The lung substance surrounding these bodies was healthy. The left lung was in a very similar condition to the right. At the root of the right lung a large gland was seen, which was equal in size to a small walnut. It cut with a sense of resistance. The divided surface had a yellowish-gray appearance, and was firm and tough. It was also pigmented in parts, but yielded no juice on pressure. See Plate III.

At the root of the neck, just above the apices of the lungs, the glands were very much enlarged. On cutting into one, which was the size of a walnut, it was seen to have a gray or pinkish-gray appearance, and was firm and tough. In parts the gland substance had a yellowish-gray colour. There was no caseous appearance. (See Plate V). The glands in front of the lumbar region were also much enlarged, and presented a similar appearance to those just described, excepting that they were

not tough and firm. The inguinal glands were similarly affected. The gland substance yielded no juice. In the liver was a pinkish-gray mass about the size of a florin, which was also firm, but not very tough. In one kidney was a similar but smaller mass. The spleen was enlarged, but not very much so; when cut into, some yellowish, firm, circumscribed masses were seen; they varied in size, some were about three quarters of an inch by half an inch, others were about the size of split peas; all had the same appearance, but differed in size.

Stomach, intestines, and peritoneum were healthy.

Microscopical examination. (See Plate IV.)—Sections were taken from the growth situated in the region of the thymus, and they were examined by the aid of $\frac{1}{5}$ and $\frac{1}{8}$ of an inch object-glasses. Their substance appeared to be made up of a large number of corpuscles and cells which were lying amongst a fine network-like tissue. The corpuscles very much resembled and were about the size of lymph or white blood-corpuscles, and besides these there were some larger cells which contained distinct nuclei, and here and there some oat-shaped

connective-tissue nuclei were seen. The tissue forming the network was for the most part homogeneous-looking, and the corpuscles were lying in the meshes of this network.

When a very thin part of the section was very carefully examined, the corpuscles were seen in some situations grouped together in a semicircular manner, and on moving the field a thin group of corpuscles was observed curving in various directions, and the arrangement corresponded with what is seen when channels lined with cells are cut across. Running between and separating some of these groups were clearer spaces, which were bounded by some firm, ill-defined, fibre-like tissue. In other parts of the field three or four corpuscles were closely packed together, and they formed a centre, and numbers of other corpuscles were found lying in a network, and the corpuscles and fibres of the network were converging around these centres. Here and there minute blood-vessels were cut across, and the lymph-like corpuscles were collected in larger numbers around the vessel, and the corpuscles and network were arranged in a concentric form around the vessels.

The manner in which the corpuscles were arranged appeared to indicate that the growth consisted of gland tissue, and the appearance of the corpuscles and the way in which they were grouped resembled the medullary or so-called lymph tubes of lymphatic glands, and the passages between the tubes corresponded with the lymph paths. Further, the manner in which the corpuscles were arranged around the vessels resembled what is seen in normal lymph glands. It would appear, therefore, that the growth was made up of lymph gland tissue.

The masses in the lung were carefully examined, they consisted of corpuscles similar to those observed in the growth above described. These were seen in largest numbers outside and around the minute bronchial tubes, and they were observed extending along the alveolar walls, and in some parts they filled up the alveoli. These corpuscles also existed in large numbers around the vessels.

The microscopical appearances observed in the enlarged, firm, indurated glands resembled, for the most part, the growth in the thymus region, also the masses in the spleen. I was, therefore, led to conclude from the microscopical

examination that the growths situated in the thymus region, in the lungs and spleen, and in the lymphatic glands, consisted of the same histological elements, and that they were pathologically the same, and that these growths resembled lymph gland tissue, and corresponded to what has been observed in Hodgkin's disease, or as it is sometimes called lymph adenoma."

The clinical features of this case were full of interest, and the diagnosis by no means easy. The high temperature and other febrile symptoms, together with the general signs of bronchial irritation, closely resembled tuberculosis, and it was at one time suggested that the physical signs in the præcordial and sternal regions were due to pericardial distension from tubercular inflammation and effusion. The pain and tenderness, the position assumed by the patient, and the rapid pulse, favoured this view, which the form and situation of the swelling suggested. But neither the aspect nor the character of the breathing were those of cardiac disease. Nor was the heart's action ever irregular, and its sounds, though indistinct, were more defined than was consistent with the very large amount of effusion that must have

existed to account for the extent of dulness and swelling. Nor did the situation of the apex beat low down in the epigastrium consist with this view of the case. Moreover, the sense of resistance on percussion was not that of a distended pericardium, nor did the previous history correspond with that of sub-acute or chronic pericarditis. But throughout the whole progress of the case the pulmonary signs were those of disseminated tubercle, and the chief reason for doubt as to their real nature was the fact that they remained the same without taking on the characters of advancing disorganisation. I was ultimately forced to the conclusion that the anterior swelling was due to a mediastinal tumour, but whether this was cancerous or scrofulous in its nature was still doubtful.

The paroxysmal nature of the febrile symptoms, and the intermittent character of the signs of bronchial irritation, were remarkable features of the case, and now that they are viewed in the light afforded by the post-mortem examination acquire special interest.

In the twenty-first vol. of the 'Transactions of the Pathological Society' Dr. Murchison has recorded a very interesting case in many of its

clinical features, closely analogous to that now under consideration and unquestionably of the same nature. He specially remarks on the paroxysms of fever which corresponded with the periods of growth in the enlarged glands, and which, so far as he has been able to discover, had not been noticed in any previous case. But the disease was very widely distributed in his case, and especially were the external lymphatic glands much more extensively implicated. The condition of the lungs appears to have been the same in both cases, numerous opaque whitish-gray masses studding the pulmonary tissue. The mediastinal tumour corresponding in situation to the thymus gland was not, however, in proportion so large in Dr. Murchison's case as in mine. I had not the same facility for observing the correspondence between the febrile paroxysms and the increase of the glandular disease as Dr. Murchison had, but the increase of pain and tenderness, and swelling of the mediastinal tumour, distinctly coincided, in my case, with the febrile symptoms and with the signs of bronchial irritation. Moreover, the early history in my case seemed to indicate that the disease had been intermittent in its progress

before it came under my observation. It will be an important assistance to diagnosis if it be found that similar febrile paroxysms characterise other cases of the same kind. There is an affection of the lymphatic glands, prevalent in the islands of the South Seas, which may be analogous to that described by Trousseau as occurring in young creoles, and which, as Dr. Murchison observes, differs in its nature from that under description, but which is characterised by febrile paroxysms occurring at longer or shorter intervals, during which there is marked increase in the glandular swellings. I once saw an example of this in a gentleman who had resided some years in the South Seas, and who was still the subject of enlarged glands of the groins and thighs, the remains of the acute form of the disease. This affection is in all probability of malarious origin, judging from the account given me by my patient. It is not confined to young persons, nor apparently excited by any local irritation, as appears from Trousseau's statement to be the case in the creoles of the islands of Reunion and Mauritius.

In the case which I have described there was no disease of the intestinal glands.

The blood, I regret to state, was not examined, and I cannot, therefore, say whether there was any increase in the white corpuscles.

From two admirably coloured drawings made by Mr. Hurst, from the recent specimens, reduced copies have been made, and are represented in Plates II and III. Plate IV represents the appearances of the minute structure of the main tumour as seen under the microscope.

The following case will be admitted to be of great interest and extreme rarity, if it be not altogether unique. Death from pressure occasioned by enlargement of the thyroid gland does, indeed, occasionally occur, but in all such cases hitherto recorded, so far as I know, the enlargement has been chiefly above the sternum surrounding the larynx, and manifest during life, leaving no room for doubt as to the nature of the obstruction to the respiration. In the following case the obstruction was entirely intra-thoracic, and its true nature discoverable only after death.

Case 14.—*Bronchocele; acute hypertrophy of the thyroid gland; tracheal occlusion; tracheo-*

tomy ; death.—"A young gentleman, 19 years of age, who had enjoyed good previous health, but who had latterly grown very rapidly, and attained a height of six feet one inch, went up to the University of Oxford in the October term apparently well. Being likely to gain high honours, he worked hard, but took a good deal of active exercise. He soon became subject to paroxysmal attacks of dyspnœa, coming on only during exertion, and having the character of asthmatic paroxysms. His general health, however, remained good, and he had a hearty appetite ; he had no cough, nor any affection of his voice. On returning to town at Christmas, he consulted a physician, who examined the larynx by the laryngoscope, but discovered nothing beyond some apparent lividity of the mucous surfaces. Subsequently, the end of the uvula was removed, with, as the patient thought, some benefit. For a few days he appeared better, but the friends noticed some wheezing and whistling in his breathing, when seated at table and when quiet ; he, however, remained free from cough or expectoration, and had no dysphagia. The paroxysms of dyspnœa continued to return ; and one morning, on going

out for his walk, he was seized with an unusually sudden fit of extreme difficulty of breathing, obliging him to seek rest in the first house that he could reach. This was three days before his death, and from this time his paroxysms became more frequent, and in the intervals his breathing was difficult. There was still, however, neither cough, nor dysphagia, nor pain, nor any lividity of countenance. His appetite continued good, so that he ate a couple of chops for dinner the day but one previous to his death. On the Saturday and Sunday (the day of his death) he became very weak and exhausted, and fainted on getting out of bed after prolonged difficulty of breathing. Antispasmodics and other remedies that were used gave no relief; but on one occasion, after being sick, he was for a time a good deal relieved."

"About eleven o'clock on the Sunday evening I was sent for, and saw him for the first time with his medical attendant, Mr. Jackson. I found him sitting up in bed breathing with extreme effort and difficulty; his face was pale; he was sweating profusely, and his pulse was rapid and full, and of good strength. The tongue was somewhat furred and coated. He

swallowed without difficulty; was able to speak a little, and had no local pain. There was no laryngeal stridor, nor had his voice any laryngeal character. The heart was beating forcibly and rapidly, and no bruit was detectable. His neck was thick and dilated at the base, apparently from diffused enlargement of the thyroid; but there was no distinct tumour or definite swelling either of the isthmus or lateral lobes of the gland. The enlargement was a general diffused expansion of the base of the neck. This had only been noticed a few days previously, but when questioned with reference to it, it appeared that he had complained of his shirt-collars being too tight, and had had them let out. I made a careful examination of the chest, but could detect nothing beyond evidence that scarcely any air was entering the lungs; and the like negative results had attended previous examinations by Mr. Jackson and others. The breathing all this time was forced and heaving to an extreme degree, beyond anything I had ever before witnessed. The lower end of the sternum and the epigastrium were drawn in so as to create a deep hollow at each inspiration, and every auxiliary muscle was

called into the utmost forced action. The jugulars were distended; but there was not the least lividity of countenance, nor any great distress depicted beyond what indicated exhaustion. Although the heart was beating forcibly, and the pulse was of good strength, it was evident that complete exhaustion must soon ensue on such long-continued violent and fruitless efforts to fill the lungs, and that on the cessation of such efforts, asphyxia would rapidly follow. It was therefore determined to send for a surgeon with the view of entertaining the question of opening the trachea, although everything indicated that the cause of obstruction, whatever it might be, was situated low down, and it did not seem probable that tracheotomy could be of much avail. Mr. Bryant was sent for about midnight, and arrived a little before one o'clock. In the interval the patient's strength failed him; the frightful efforts to breathe grew fainter, and asphyxia rapidly set in. He could no longer swallow, and became livid and unconscious. Mr. Bryant, on his arrival, concurred in the opinion that the obstructing cause was probably so low down as to render it very unlikely that tracheotomy could be of any use. But all

hope of life having fled, and the friends consenting, the trachea was immediately opened on the chance of prolonging life by gaining such further insight of the nature of the obstruction as might thus be obtained.

"An incision was made in the median line, through the centre of the thyroid, which proved to be much thicker than was anticipated, and the trachea much deeper than natural. The second and third rings of the trachea were divided, and the tube passed in without difficulty or loss of time. No air, however, passed through the tube, and a female catheter was passed down the trachea. This, however, struck against what was imagined to be the bifurcation of the trachea, and no air passed through the catheter either. The aorta could be felt pulsating violently when the finger was passed into the opening of the trachea. No relief was obtained from the operation, and he sank very shortly afterwards."

Post-mortem examination thirty-six hours after death.—The thyroid gland was found greatly enlarged (when removed it was almost as big as the two fists), but the enlargement was mainly below the sternum and along the sides of the trachea.

Immediately below the orifice made by the surgeon, the trachea became so compressed as to be completely flattened laterally from that point, to within half an inch of the bifurcation; it was also twisted to the left, and was surrounded by the greatly enlarged and firm lateral lobes of the thyroid. There were no enlarged bronchial glands, nor any pulmonary or cardiac disease. The aorta and large vessels were healthy; the larynx was healthy; the mucous membrane of the trachea was congested; the lungs were pale and collapsed; but the upper lobes were emphysematous. The structure of the thyroid gland appeared healthy, but very firm, and the enlargement was due solely to hypertrophy, and not to cystic or other apparent disease."

There was no exophthalmos in this case, but I think it probable that, had the symptoms indicated *laryngeal* obstruction, the condition of the parts above the sternum would have led to the conclusion that the obstruction was due to an enlarged thyroid; but I felt satisfied from the character of the dyspnœa and the absence of true laryngeal symptoms that the cause of pressure was deeply seated below the larynx.

Had the patient been examined when perfectly tranquil it is probable that some dulness would have been detected over the upper part of the sternum, although the emphysematous condition of the upper lobes might have concealed any evidence of that kind. But the symptoms so clearly indicating pressure below the larynx—the most probable cause that suggested itself to my mind was some scrofulous enlargement of the bronchial glands. As an example of acute rapid hypertrophy of the thyroid the case points to the propriety of regarding any acute enlargement of that gland in young people with more anxiety than we are perhaps accustomed to do.

The surgical lesson taught by this case my friend, Mr. Bryant, like a good surgeon, has at all events not been slow to learn. He at once had made for him a long perforated tube capable of being passed down to the bifurcation of the trachea and into the bronchus. It was not long ere he had an opportunity of employing his new instrument.

A man came under his care at Guy's Hospital last July with a tumour situated in the right cervical region of nine months' growth which

looked like a goître. It had displaced the larynx for about an inch out of the median line. He had had repeated attacks of difficulty of breathing, threatening life. Notwithstanding the local application of cold and perfect rest the tumour increased in size, and the difficulty of breathing became worse, with frequent attacks of spasmodic dyspnœa. In these circumstances an attempt was made on the 22nd August to remove the tumour by enucleation; but on exposing the growth it was found that the vessels and nerves of the neck ran through its centre. The operation, therefore, was abandoned. At this stage of the proceedings the patient ceased to breathe; tracheotomy was therefore performed, but no air passed out of the chest. A long, perforated tube was then introduced through the canula into the bronchus, when a rush of air immediately followed, and was succeeded by natural respiration. The man expressed himself as greatly relieved by the operation, and all went on well for two days,—so well that the tube was removed, and the patient was able to breathe without its aid. Broncho-pneumonia, however, set in, and on the 25th August the man died.

After death the tumour was found to be glandular (lymphoma), through which the cervical vessels passed. It had pressed mechanically on the trachea behind the sternum, and thus occasioned its occlusion. There was but little air in the lungs, which were much consolidated.

It has not fallen to my lot to meet with any example either of cystic or hydatid disease within the thorax, and I therefore abstain from saying more than that the recorded cases show that, while the difficulties of diagnosis are sometimes as great as in other varieties of intra-thoracic growth, in several instances the expectoration of portions of the hydatid cyst or of ecchinococci has demonstrated the real nature of the disease. The duration of some of these cases has been much greater than in any instance of intra-thoracic cancer I have seen or heard of, and the prognosis is certainly much more favorable, for various instances are on record of recovery after the expectoration of hydatids.*

* See an interesting and elaborate paper in vol. iv of the 'Trans. of the Path. Soc.,' by Dr. Black, and also vols. ix and xv for two cases recorded by Dr. Hare and Dr. Peacock.

In the forty-ninth vol. of Virchow's 'Archiv' there is a valuable paper by Dr. Franz Riegel on the pathology and diagnosis of mediastinal tumours, and the history of an interesting case of what does not appear to have been a cancerous but rather a lipoma sarcomatous mediastinal growth overlapping the heart much in the same way as is represented in the drawing of my case of lympho-sarcoma.

CONCLUDING REMARKS.

The selection of cases occurring in my own practice, described in the preceding sections, has been made with the view of illustrating some of the very different aspects under which intra-thoracic growths present themselves to the clinical physician. But in truth almost every case presents peculiarities of its own. And it is this great diversity which constitutes the principal difficulty in the diagnosis. In many cases, indeed, the diagnosis may be said to be easy enough, whilst in others the most careful study of both signs and symptoms, local and general, will not secure us against errors till the case is far advanced towards a fatal termination. Physical examination will not always tell us whether the lungs are invaded or not, nor even whether it be by fluid or by a solid mass that the pleural cavity is filled. It is in the early stages that most obscurity exists,

and as the disease advances the order of procession of the symptoms, or the manifestation of external signs, will usually dispel all doubt. Intra-thoracic cancer, as long as it is uncomplicated by cancerous invasion of other organs, particularly of the digestive organs, will frequently be found unattended to a very late period, if not throughout its whole course, by any of those general symptoms which are commonly supposed to characterise the cancerous cachexia, such as the peculiar tint of skin, progressive and great emaciation, and aspect of suffering. In several of the cases that I have detailed the general aspect of the patient gave no indication whatever of the nature of the disease. Failure of appetite without sufficient assignable cause, and gradual, increasing and often marked debility, with some quickening and deficiency of power in the pulse, have been the general symptoms most commonly noticed by me; sudden and transitory pain in some part of the chest, induced apparently by some unusual bodily exertion or physical injury, has been mentioned in many of my cases. This has been generally soon forgotten till other symptoms have supervened. But patients have,

in several instances, assured me, that from the time of the occurrence of such pain their health has begun to decline. The most frequent of the early local symptoms according to my observation has been some indication of bronchial irritation, and this whether the lungs have or have not been early implicated. Some kind of bronchial irritation has been noticed very early, even when the disease has distinctly commenced in the mediastinum and cough, with or without expectoration, has been one of the most frequent symptoms mentioned by the patients themselves. This cough, though varying in kind, more frequently presents the character of simple bronchial irritation, in other instances, however, it has assumed a spasmodic or paroxysmal character, apparently due to the implication of one or other of the vagi nerves either by pressure or early inflammatory or reflex irritation. The expectoration, if any attends the early stages, is usually simply mucous, but, not infrequently, from time to time, contains specks or streaks of blood. Dyspnœa on exertion is the next earliest symptom, which, like the cough, sometimes very early assumes a paroxysmal character. But for a long time the

patient may be quite free from any local subjective symptom even though a growth may have attained to a considerable size. Thus, a case is related by Jaccoud* where the fatal termination of a large intra-thoracic growth occurred within eight days of the patient's admission to the hospital. Prior to his admission the patient had suffered from no subjective symptoms whatever, although at that time there was physical evidence of a large growth extending from the clavicle to the nipple. Pain, dyspnœa, and other symptoms of functional disturbance appear to depend not only on the situation and extent of the disease, but also on the rapidity of its development, and in this there is great diversity. Dr. Walshe estimates the mean duration at 13·2 months, the maximum at 27 months, and the minimum at 3·5 months. But in the absence of precise information as to the period of actual commencement in the majority of cases, but little value can be attached to any such calculations. There are several cases on record, besides that reported by Jaccoud, from which it may be inferred that the disease may run its course in much less time than three months.

* 'Leçons de Clin. Med.,' p. 136. Paris, 1867.

Except in some rare cases physical signs will be wanting altogether until the disease has made considerable progress. When these occur they vary greatly in their character according to the structures implicated and the form which the disease assumes. Thus, evidence of pleuritic inflammation and exudation may occur very early, or not till late, or not at all throughout the whole course. Signs of pressure in like manner may occur very early or not till other physical signs have proclaimed the existence of a solid growth. The situation of the growth, even at a very early period, may so interfere with the calibre of a main bronchus as materially to modify the respiratory and local phenomena, whilst in other instances the bronchi may remain so free as to allow of the ready entrance and exit of air to healthy lung, although a considerable tumour may exist at the base of the lung and in the mediastinum. Even when the lungs themselves are extensively implicated the respiratory and vocal phenomena will necessarily vary according as the bronchi remain patent or not. The lungs may very early be rendered more or less atalectatic, or they may be congested or enlarged.

The thorax may retain its natural form, or there may be local or general flattening or enlargement of one side. All attempts, therefore, to lay down precise rules for the differential diagnosis of intra-thoracic growths based on the physical signs alone has appeared to me little more than waste of time. Of what avail can it be to discuss the differential diagnosis between pleurisy with effusion and a cancerous lung, when, on the one hand, the latter may have occasioned copious effusion into the pleura, and, on the other hand, the former may be complicated by the existence of old adhesions and more or less consolidation of lung from tuberculous or other chronic disease? In every instance we must take into careful and minute consideration the history of the case and the order of succession of the phenomena, together with the existing physical signs, and it will generally be found that these do not harmonise with any of the more ordinary forms of disease. By a rigorous application of the principle of exclusion, we may often come to a tolerably confident diagnosis, even in cases presenting great complexities and difficulty.

As regards the temperature in cancer, my

own observation corresponds pretty much with the results of such experiments of others as I am acquainted with. In the generality of cases in which cancerous disease of internal organs is slowly advancing, there is usually remarkably little pyrexia. If the pyrexia be more pronounced, or if the temperature be abnormally high, without other pyrexial symptoms, there is reason for believing either that rapid cell growth is taking place, and the cancer is growing fast, or that secondary inflammation has been set up, either from pressure or some other accidental cause. The marked contrast between the high temperature of tubercle on the one hand, and the usually low temperature of cancer on the other, will not, therefore, be of much avail in the diagnosis of the very cases where we are most in need of any help that the thermometer might give, viz., those cases of miliary or diffused cancerous deposits, which both in their general symptoms and physical signs most closely simulate acute tubercle. Dry cough, night sweats, and wasting are all frequently associated in cases of intra-thoracic cancer, without any increase of temperature, and the inference would then generally be in favour of cancer, and this

inference would receive additional confirmation if there were marked anæmia.

I cannot recall any case in which the progress of cancerous disease has not been continuous. A considerable amount of relief may, indeed, be obtained by rest and due attention to the general health, careful regulation of the digestive system, change of air, and other hygienic measures. Tonics, especially chalybeates, will often be useful, and special symptoms admit of considerable alleviation. Counter-irritation by means of mustard poultices and small blisters will often relieve local pain, whether connected with local inflammation, or mere disturbance of innervation. The patients themselves are so satisfied of this as often to ask for a repetition of small blisters. In other instances, however, more relief is obtained from the external use of anodynes and poultices. Cold, from which signal relief and even enduring benefit is often obtained in aneurism, has never appeared to me to be of any service in cancer of the chest, although it has been the means, apparently, of arresting the progress of external cancer in certain cases. In some of these, however, as in an instance recorded by M. Simon, the arrest

of the external disease has been of very questionable benefit, having been apparently the determining cause of the invasion of internal organs.

The amount of mere pain is seldom such as to call for the use of any large quantity of opium or other narcotic. But the distress arising from dyspnœa, inability to lie down, and the loss of sleep is often very great. To relieve this distress will often tax the physician's ingenuity to the utmost, and inasmuch as it depends on very various conditions of the respiratory and circulatory organs, it will require very different remedies in different cases. The harassing unrelieving cough, attended by scanty expectoration, often streaked with blood, has, in some instances, been relieved by minute doses of antimony, associated with some sedative. There is, however, great susceptibility to the action of any depressing remedy, and it is only for a time, and with great caution, that such remedies admit of being tried. When the dyspnœa has been associated with evidence of extreme venous congestion, I have sometimes been tempted, but never ventured, to seek relief by abstracting blood from the distended jugulars, and although

I have never myself had recourse to paracentesis when there has appeared to be evidence of considerable fluid accumulation in the pleura, the results of this procedure, in those instances where it has been had recourse to, whether from erroneous diagnosis or not, have not shown that any evil has followed; and there can be no doubt that in some cases the dyspnœa and general distress have been much aggravated by the pressure exercised on the healthy or comparatively healthy lung of one side, by fluid effused in the opposite pleura. In such cases, at all events, there need be no hesitation in having recourse to paracentesis.

It seems probable that some at least of the cases recorded under the designations of cancerous and sarcomatous tumours of the mediastinum have been really examples of what are now generally denominated "lymphoma" or "lymphadenoma," of which the case described in the preceding pages is so interesting an example. A very similar instance has recently fallen under the care of my friend, Mr. Le Gros Clark, at St. Thomas's Hospital. The general and microscopic characters of the mediastinal tumour were precisely those presented in my

case; but the external glandular disease was much greater and more evident during life. Several other cases have also occurred in the practice of the London Hospitals since my attention was drawn to the peculiar featnres of the girl's case which I have described.

Whether our therapeutic resources may prove more available in this disease than in cancer, when its natural history is more perfectly known, we cannot say, but it is at all events desirable that it should be early recognised and trial made of such means as may appear to hold out most prospect of benefit. The rapidity of its development evidently varies greatly, but in some instances its course is slow and offers opportunity for therapeutic efforts. The preparations of iodine combined with chalybeates and suitable hygienic measures naturally suggest themselves as deserving of full trial; and it is a question meriting particular attention whether the disease is not connected with special climatic or endemic influences.

It would appear that the lungs are liable to be affected by almost every variety of morbid growth occurring in other parts of the body. Colloid cancer appears to be rarest of all the

forms seen in the lungs. A preparation in the very rich pathological museum of St. Thomas' Hospital is the only example that I have seen.

What is termed osteoid cancer is also very rarely met with in the lungs. But of this also there is a very remarkable example in the St. Thomas' Museum. In this instance the disease in the lungs followed the removal of an osteoid tumour of the thigh in a lad, by Mr. Simon. The lungs and pleura were found after death thickly studded with tumours of the size of a cherry and under, having the general characters and microscopic appearances of imperfectly formed bone, the surrounding lung-tissue being healthy.

Mr. F. Carr Jackson* has recorded a similar case of osteoid growths in the lungs succeeding to the removal of an osteoid tumour of the humerus of a boy, which, the reporters state, corresponds to three cases narrated by Virchow,† in all of which many ossifying sarcomatous knots were found in the lungs. The patients were young adults, aged 28, 22, and 18 years. The seat of the primary tumour in one case was the caput humeri, and in the others it was the femur.

* 'Trans. Path. Soc.,' vol. xx, p. 25.

† 'Die Krankhafte Geschwülste, Bd. ii, Hälfte ii.

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