THORACIC SURGERY,
AN INTRODUCTORY CHAPTER.

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Few things are more dramatic and stirring in the general advance of medicine to-day, than the progress and evolution of thoracic surgery. In the last quarter of a century more has been achieved than in the preceding two and a half millenia. Three years ago, a lady from S. Africa came to London for advice about her bronchiectasis, which was secondary to a foreign body which had remained six months impacted in a bronchus before being coughed up. Lipiodol showed the dilatations to be confined to the lower half of the right lobe. A phrenic evulsion was performed, but not much was promised from it. She was told at the time, that, were the technique slightly further advanced, lobectomy would be the treatment of choice, and one which would eradicate the whole of the affected part. Three years passed, and she returned. She was worse, with clubbed fingers, and intolerably offensive breath and sputum. Lobectomy was advised. This was done, and in six weeks she was walking in the open air, her symptoms cured, the diseased lung radically removed. This will illustrate the rapid advance that is being made on the technical side.

That this is no isolated case may be seen from the recent brilliant publications of J. E. H. Roberts and H. P. Nelson, A. Tudor Edwards and C. Price Thomas. In their hands the mortality from lobectomy has fast diminished and the results rapidly improved, until it has become a practical measure and probably already the method of choice in treating suitable cases of bronchiectasis. The last quarter of a century has been quoted as the period of advance, but the stagnant pool was showing signs of ebullition before this. Hippocrates found the spring; he operated not too inadequately for empyema. He actually produced artificial pneumothorax and oleothorax, but after his time the spring was choked by false and vain hypotheses and no advance was made until the tentative beginnings which began to emerge in the last decade of the eighteenth century, and which were gradually to develop throughout the nineteenth. During this period came the discoveries of percussion, auscultation, the exploring needle, cytology and bacteriology. These advanced diagnosis by leaps and bounds. Just about the time of the announcement of the discovery of the tubercle bacillus, Forlanini published his first contribution on artificial pneumothorax in 1882, and Arbuthnot Lane, in the same year, published in the Guy's Hospital Reports, his new method of treating acute empyema by primary rib resection. In 1881 and 1882, Gluck and Biondi were performing their extraordinarily successful experiments on lobectomy and pneumectomy in animals.

The value of Forlanini's clinical application of Carson's suggestion with its innumerable repercussions, to the whole subject of collapse therapy and to our knowledge of intrathoracic pressures, the behaviour of the pleura, pleural herniation, and pleural effusions, is incalculable.

While Arbuthnot Lane's innovation revolutionized the treatment of empyema, which had been in a parlous way, though gradually struggling up to the light in the previous decade or two, it did as much harm as good in other directions,

for the new method was seized upon with an indiscriminating enthusiasm, and children under two were so treated, with a mortality of over 90 per cent., and acute streptococcal and tuberculous empyemas, and even clear serous pleural effusions were subjected to the same method with disastrous results. Gradually, however, with the increase of bacteriological knowledge, the appreciation of different types of empyema and pleural effusion, the realization that pus was not caused by the oxidation of a serous fluid, as Clifford Allbutt once thought, the growing knowledge of intrapleural pressures and mediastinal flutter, the true indications for rib resection and open thoracotomy, were recognised and established. Even now there are disputes over the site and method of drainage; there is a tendency to obscure the simple issue of pleural drainage and lung expansion, and to regard the pleural cavity as a sinus, and if a growing trend to insert long and large tubes prevails, it will, in my opinion, retard convalescence and produce a crop of chronic empyemas. This observation is intentionally provocative, for I know surgeons, for whose skill and technique I have the greatest admiration, who hold a contrary view. In any case this is a digression, for I had set out to date the renaissance in thoracic surgery from about the middle of the nineteenth century, soon after the time when Thomas Davies first employed the exploring needle, when Skoda, Trousseau and others were earnestly advocating the adequate drainage of empyemas.

It is only necessary, however, to read a treatise on chest surgery of thirty years ago, to realise the phenomenal advance that has been made since then. Reference has already been made to lobectomy and pneumectomy in animals. Biondi's figures are most striking:—

	Operations.	Recoveries.
Removal of whole of the right lung ...	23	12
,, ,, ,, the left lung ...	34	18
,, ,, ,, both apices ...	3	3
,, ,, ,, middle lobe ...	1	1
,, ,, ,, lower lobe ...	1	1

This was soon applied to man, at first unavailingly and fatally, but in 1891 Tuffier, and in 1893 D. Lowson, successfully resected a portion of the right upper lobe for tuberculous disease, and the description of these cases is truly remarkable. The more recent application of this procedure to bronchiectasis, however, has led to its rapid evolution, and is developing rapidly, we hope and believe, to a stage when lobectomy will inspire no more fear than appendicectomy. It remains to be seen whether it may as safely be applied to tuberculous disease.

Fortunately, one discovery after another has been made which has been immediately applied to the diagnosis and treatment of intrathoracic conditions. Surgical conceptions and technique have marched step by step with the advance in new methods of diagnosis, new modes of procedure and discoveries in the ancillary sciences. The X-rays, feeble enough at first, have become the chief instrument for accurate diagnosis and localization that we possess. Artificial pneumothorax has taught us much of value concerning intrapleural pressures. The chest and lung injuries of the war taught us that lung tissue could be handled as other tissues, with certain exceptions, and had no *noli me tangere aura* about it, that positive and negative pressure chambers were unnecessary for thoracotomy and that mediastinal flutter must be avoided. Meanwhile, the art of bronchoscopy was being steadily developed, and with this the name of Chevalier Jackson must

ever be intimately associated. Jacobæus introduced the thoracoscope which, with its modifications, has proved of the utmost value in diagnosis and in treatment.

Then came lipiodol, introduced by Sicard and Forrestier, without which the modern operation of lobectomy for bronchiectasis would be impossible, for without its aid we could not accurately diagnose nor localize the lesion, nor exonerate the rest of the lung from disease.

With the rapid march of these discoveries, anæsthesia has not lagged behind, and without the almost perfect method of anæsthesia employed, none of the advances would have permitted the successful evolution of thoracic surgery which we see proceeding before our very eyes. The bodily comfort and mental calm induced by the so-called basal narcotics, the judicious combination of local anæsthesia with gas and oxygen, given skilfully through a long operation, with the patient a good colour, without a trace of cyanosis and restlessness throughout, all are powerful factors in reducing mortality, in preventing shock and avoiding inhalation pneumonitis.

Lastly, there is the brotherhood of thoracic workers, international and world-wide, the value of which in pooling knowledge and improving technique cannot be exaggerated.

A purposeful digression was made when discussing the baneful effect of the indiscriminate adoption by all and sundry of rib resection, a warning which should be taken to heart to-day. Lobectomy in the experienced and skilled hands of the highly-trained thoracic surgeon, is a practical operation with a rapidly decreasing mortality. The moment it is realized to be safe and effective, there will be a large number of lobectomies required for bronchiectasis and other suppurative conditions, and for malignant growth. If this is to become a routine procedure by any surgeon, the mortality will be frightful, and the method will fall into disfavour and desuetude. Nevertheless, the work cannot be kept in the hands of a small body of highly trained pioneer thoracic surgeons. It will have to become far more general, but before it is undertaken by the general surgeon, he must learn the principles and technique to the very minutest detail. At one time the operation of thoracoplasty was considered a frightful one; now one expects no shock, little pain and no mortality.

This state of things has not been gained without much research and thought, hard work, suffering and disasters. This stage once passed, no surgeon is justified in embarking on the major thoracic surgery who has not mastered its principles and its details.

For primary intrathoracic tumours, which we are seeing in such appalling numbers to-day, surgery will probably come into requisition more and more. I feel as I do regarding bronchiectasis, that surgical removal gives the only prospect of radical cure at the present time. Certain tumours, such as sarcoma, and those of thymic and thyroid origin, appear to be radio-sensitive and amenable to cure, or control by X-ray irradiation in certain cases, but I know of no cure of a primary bronchial carcinoma by irradiation, though many impressive cases of relief of urgent symptoms have been recorded in a recent paper by the writer with Drs. Finzi and Maxwell. The technique of lobectomy for tumour has fewer hazards than that for suppurative conditions. Great judgment, however, is required in selecting cases for operation, or if thoracotomy is decided upon, in knowing whether to proceed or not. Some help may be obtained from the skiagram, or from bronchoscopy, with regard to the involvement of mediastinal glands.

Transverse sections of the whole of both lungs and mediastinum, such as is being pursued by Mr. H. P. Nelson, will show the usual starting points and mode of spread of the growth. It is unavailing to remove the primary bronchial carcinoma, and leave affected mediastinal glands. Attempts have been made to irradiate these with radon inserted through the bronchoscope, but to the writer this appears an uncertain, hazardous and blind approach. Some remarkable results have been achieved by surgical methods in malignant intrathoracic tumours. Mr. Tudor Edwards has kindly supplied me with the following figures. He has three patients, alive, well and symptomless, 7, 6 and 5 years respectively after lobectomy, complete or subtotal, for malignant disease; 3 patients alive and without recurrence to date $3\frac{3}{4}$, $2\frac{3}{4}$ and 2 years respectively after direct insertion of radon into the growth in the lung; and three patients free from recurrence three years after insertion of radon into a bronchus. Most of them were not primary bronchial carcinoma. These figures are very remarkable, considering the desperate nature of the disease, and compare quite favourably with the brilliant results achieved by lobectomy for bronchiectasis which have been quoted. Without intending in any way to disparage these brilliant results in malignant disease, there are certain facts of which we must take cognizance in considering reports of cure. Some growths described as cancer are not always such. There has been a considerable change in histological terminology within recent years. There is at present a lack of complete agreement between pathologists of distinction, and, apart from this, they, like clinicians, are subject to errors in interpretation. Secondly, it is probable that the natural history of the untreated primary bronchial carcinoma may be a long one; authentic cases are reported with as much as a five years' history.

Thoracic surgery advances, and there is every reason to anticipate further achievement. Tuberculosis, lung abscess, bronchiectasis and other suppurative conditions, innocent tumours and cancer, are gradually yielding to the skill and ingenuity of the surgeon, aided by team work with the physician, pathologist, radiologist, anæsthetist and instrument maker. Without this team work, I do not believe that the progress would have been possible, nor will it continue to its highest development if this association is broken.

The problem of asthma has been tackled surgically, and if I write now, as indeed I feel, that the treatment of this condition by open thoracotomy and sympathetic nerve section is rashly dangerous and probably useless, it would not altogether surprise me if I had reason one day to repent my obstructive diffidence. We must remember that Trousseau, though he did so much to advance the treatment of empyema and pyo-pericardium, taught that lung abscess was altogether beyond the reach of surgery. New methods can be envisaged for the closure of adherent apical cavities, the removal of tuberculous areas, and the drainage of bilateral bronchiectasis not amenable to lobectomy, and many other conditions. The limitation of purely medical treatment is too apparent to need elaboration. Until we know how to prevent diseases of the chest, we shall have need of surgery, and perhaps an increasing need. New tentative and experimental operations will be wanted, devised and designed, and though we must ever apply the golden rule, and though we would never willingly add one iota to our patient's sufferings, we shall frequently be compelled to ask ourselves, is the condition such, and is the patient's bodily and mental suffering such, that almost any risk is warranted? and it is just at this point that the patient so often comes forward and makes the decision for us.