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Presidential Address

Retrospect and prospect

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It is a mark of the warm feeling of friendship which extends across the 49th parallel of latitude that from time to time a Canadian has had the honor of election to the presidency of this Association. In this, our 50th Anniversary Year, it is a very particular honor and carries special responsibility. I am deeply appreciative that this privilege has come to me, and realize fully that I am here to represent my Canadian colleagues, many of whom have made significant contributions to our art and science.

Our Association has been international from the beginning; one of the founding members was Edmond Melchior Eberts of the Montreal General Hospital. In 1917 he was interested in thoracic surgery but later was diverted from this field and made his chief reputation as a thyroid surgeon.

The significance of the title of my address is that I wish to sketch in a little of the background from which we have come, to indicate, however briefly, some of the things our founders were doing, some of the surprising things they knew, and some of the equally surprising things which they had failed to recognize. Having done so, I shall refer to some of the problems which face us now and will face our successors.

In looking back we must take account of the state of the Western World in the middle of 1917 when Willy Meyer took the steps which resulted in the birth of the Association. For 3 years most of the countries of Europe and the countries of the British Commonwealth, including Canada, had been locked in desperate combat; the United States was about to bring its massive strength to the aid of the Allies in time to assure their victory. Much had been learned by the French and British military surgeons about wounds of the lungs and heart and of the dreadful infections spawned by the Flanders soil. This knowledge was freely available to our founders and was soon to be added to by the brilliant group of surgeons of the Medical Corps of the United States Army.

It was perhaps prophetic of the many contributions to knowledge of the physiology and pathological physiology of the lungs and heart which have been made by our members that our first president, Samuel Meltzer, was not a surgeon; he was a physiologist-physician. That he was elected president instead of Meyer was certainly

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the result of a very generous gesture on Meyer's part. This was perhaps to make amends for a dispute which they had had some years previously before the New York Academy of Medicine regarding the relative merits of negative pressure anesthesia, as exemplified by the chamber which Meyer had constructed at the Lenox Hill Hospital, and Meltzer's intratracheal insufflation. Meyer argued that this method might be satisfactory for healthy dogs but could be dangerous for sick human beings. A refreshing feature of the meetings of those days was that the participants really spoke their minds.

We all know that the great contribution that Meltzer made to thoracic surgery was his work with Auer in the development of positive-pressure intratracheal anesthesia, but few remember that this was one more example of serendipity. As physiologists they were experimenting with the inhibiting effects of magnesium salts on various functions in animals, including respiration, and invented intratracheal insufflation as a means of artificial respiration in the dog. Many others before them had experimented with intrapharyngeal, intralaryngeal, and intratracheal anesthesia, but Meltzer and Auer continued its development in the laboratory, and demonstrated its relative simplicity and safety. It was Elsberg,[7] of the Mount Sinai Hospital, who modified the Meltzer-Auer apparatus and first used it for a human patient on Feb. 20, 1910.

At the first clinical meeting of the Association in Chicago on June 10, 1918, Meltzer[14] chose as the topic for his presidential address "Thoracic Surgery" and Meyer,[15] at the president's request, spoke extemporaneously and at length on "A Review of the Evolution of Thoracic Surgery Within the Past Fourteen Years." The significance of the 14 years was that in 1904 Sauerbruch had constructed his experimental negative pressure chamber. As Meyer remarked, "Thus, the year 1904 marks the real beginning of thoracic surgery by the transpleural route." These two addresses and other papers presented at that meeting give us an insight into the thinking and practice of the day.

In referring to the surgery of the heart and great vessels, Meyer had said that in the main this was "music for the future." In fact, in reading the literature of the period one cannot fail to be impressed by the extent of the recorded experience with wounds of the heart, and by the courage and imagination of the operators. Following Rehn's report of his successful suture of a stab wound of the heart in 1896, many surgeons had performed a similar feat. By 1910 Kirchner[11] could report from the St. Louis City Hospital 5 cases of repair of stab wounds of the heart with three recoveries. Our founders were aware of the work of Le Fort[12] of Lille who, by early 1919, had removed bullets or shell splinters from the cavities or wall of the heart in 11 patients.

One of the effects of the development of the Meltzer and Auer technique which has been insufficiently recognized was the impetus which it gave to experimental intrathoracic surgery. The method was used by that remarkable man, Alexis Carrel,[4] who was one of our founders. In 1910 he reported to the American Surgical Association on his work at the Rockefeller Institute for Medical Research. Some of his experiments were designed to develop a method of restoring continuity of the aorta after excision of an aneurysm. He had demonstrated that the wall of an artery can be patched successfully with a piece of artery, vein, or even peritoneum, and had replaced a part of the wall of the abdominal aorta with a piece of rubber sheeting, with long-term survival. He had demonstrated that segments of arteries can be replaced by grafts of artery or vein, either fresh or preserved in cold storage, and had even replaced successfully a section of the descending aorta with a large vein. To permit these operations on the aorta he had developed bypass techniques, either by central tubing of the vessel or by a temporary shunt from the left ventricle to the distal aorta.

Carrel also experimented on the heart

itself. He pointed out that in the functioning heart it is comparatively simple to explore with the finger the interior of the auricles and ventricles and that a stenosed mitral valve could be dilated or divided. He simulated an operation for mitral insufficiency by a partial wedge excision at the base of the ventricle, with survival. He knew that certain patients suffering from angina pectoris have a segmental block near the origin of a coronary artery and a relatively healthy distal artery, and designed an operation to correct this condition. He anastomosed a preserved artery graft to a dog's descending aorta, clamped the base of the heart, and then anastomosed the graft to the distal end of a divided coronary artery, apparently the anterior descending branch. This took 5 minutes, during which time the heart developed ventricular fibrillation and the animal died. Carrel concluded that he must learn to do this part of the operation in 3 minutes or less!

Meyer's "music for the future" was coming close. Within 4 years, in 1922, Allen and Graham[2] would describe their experimental work with a cardioscope designed to permit division of a mitral valve under direct vision via the atrial appendage. The following year Cutler and Levine[6] would report the transventricular incision of a stenosed mitral valve in a young girl, with recovery.

Our founders were much concerned about the development of a better method for treating carcinoma of the esophagus. One of them was Torek. His famous patient had been operated upon in 1913 and was still alive in 1918, maintaining herself by a rubber tube external bypass from an upper esophagostomy to a gastrostomy. This seemed to indicate that the disease could be cured if recognized early; the problem was to restore continuity.

Two others, Janeway and Green,[9] had studied this problem in the laboratory, reporting their work in 1910. They had developed a technique of end-to-end anastomosis after resection of the distal esophagus and proximal stomach. Of 17 dogs, 10 survived. However, they found that the survivors showed persistent regurgitation, became emaciated, and finally died of starvation. They concluded that this complication was due to two effects of the division of the vagus nerves, paralysis of gastric contraction and failure of the pylorus to relax. When they added a pyloromyotomy to the operation, their dogs thrived. It was to be many years before this lesson was relearned!

That the place of endoscopy in the management of thoracic disease was appreciated 50 years ago is indicated by the inclusion in the founders group of the two leading American endoscopists of the day, Yankauer of the Mount Sinai Hospital and Jackson of Philadelphia. It is of interest that Jackson[5] was already attempting bronchography by blowing bismuth powder through a bronchoscope to coat the bronchi before taking radiographs of the chest.

In his 1918 address, Meyer referred to the treatment of pulmonary tuberculosis. Artificial pneumothorax was the treatment of choice, if collapse could be obtained. If the lung was adherent he recommended an extensive extrapleural thoracoplasty with removal of portions of the tenth to second or first ribs and, on occasion, the inner end of the clavicle, a phrenicotomy, and for some patients, an apicolysis with introduction of a plomb as recommended by Tuffier. At that time both fat and paraffin had been used for this purpose. The extensive one-stage thoracoplasty resulted in a high mortality rate. It was not until 7 years later when Ochsner,[16] Hedblom,[8] and Alexander[1] advocated the more limited, staged operation, that thoracoplasty became an acceptable procedure for general application.

I have mentioned some of the areas in which, in the light of present-day experience, our predecessors were quite advanced in their thinking and practice. We turn now to some of the problems which they had failed to solve. The outstanding one was pleural empyema.

Their experience was based on the common postpneumonic pneumococcal empyema in which early open drainage had been

a reasonably satisfactory method of treatment. By the time of the first meeting in 1918 they were treating large numbers of patients suffering from post-influenzal streptococcal pneumonia complicated by concomitant empyema. Much of the discussion at that meeting was on this subject. Open drainage, as soon as the empyema was recognized, was the usual practice. In these patients the vital capacity was reduced by persisting pneumonia, which was usually bilateral. In the absence of pleural adhesions, the creation of an open pneumothorax was a highly lethal procedure; the mortality rate was as high as 60 per cent. It is surprising that these very astute surgeons, who were so aware of the evils of open pneumothorax during thoracic operations, failed to recognize that they were adding the final factor which determined the patient's fate. Bulau,[3] as early as 1891, had described closed under-water drainage of the pleural space with a well-reasoned argument for its use, and one of our founders, Kenyon,[10] had actually published a paper in 1911 reporting the very satisfactory results of the method in children.

The first report by Graham and Bell as members of the United States Army Empyema Commission was made in 1918. As a result of their experimental work, the principle of early repeated aspiration followed by late drainage was soon established. In one army camp this change in treatment resulted in a fall in the mortality rate from 61.2 per cent to 9.5 per cent.[18]

In fairness we must recall that these surgeons were fully aware of the work of Fowler and Delorme, were using pleural decortication in the management of chronic empyema, and that Lilienthal[15] was already advocating his major thoracotomy, which was a pleural decortication for subacute empyema.

Although Meyer was using closed pleural drainage after elective thoracotomies, this idea had not occurred to the military surgeons of the British and French armies. Early in the war the chest was left widely open after thoracotomy for a chest wound; the mortality was in the range of 50 to 70 per cent. The surgeons of both armies by 1917 had decided to close the chest completely, whenever possible, and to deal with the empyema if it occurred. This resulted in an improvement in the mortality rate, on the order of 20 per cent, but left many problems of chronic empyema. Following a detailed discussion at the 1918 meeting, it was agreed that the Kenyon method of drainage should be used in this situation.

Fifty years ago the most challenging problem in thoracic surgery was the management of acute and chronic suppuration of the lung. There was a lack of clear understanding of the etiology of lung abscess and of the relationship of abscess to bronchiectasis, but the pitiful end results of chronic lung abscess associated with secondary bronchiectasis were all too common and easily recognized. Many methods were used in an attempt to relieve the suffering of these individuals: postural drainage, intrabronchial medication, lung compression by artificial pneumothorax or extrapleural thoracoplasty, bronchostomy to provide partial drainage. Lilienthal, Meyer, Robinson, and others among the founding group recognized that at best these measures effected only incomplete palliation, that the real solution lay in excision of the diseased part of the lung. The patients with whom they had to deal were of a kind that we seldom see nowadays—emaciated, toxic, and producing up to a liter of foul sputum per day.

A few attempts had been made to cure these unfortunates by lobectomy or even pneumonectomy. We should not criticize the mortality rate of about 50 per cent, nor the morbidity from empyema and fistula in the survivors, but rather admire the courage and skill of the surgeons who made the attempt.

There was so much that we take for granted that they did not know. Preoperative and postoperative bronchoscopic suction was not yet practiced. Blood transfusion was available, but there was little

appreciation of the real amount of operative blood loss and an exaggerated fear of overloading the circulation; blood transfusion was used only when signs of hemorrhagic shock were blatant. Postoperative atelectasis and its cause were not recognized; the patients who survived the operation all too often died of postoperative bronchopneumonia of the opposite lung. No way of dealing with the hilus of the lobe was known except by mass ligature or by multiple interlocking silk sutures to allow the stump to slough and a fistula to form, sometimes with fatal secondary hemorrhage. Even 7 years later, in 1925, that great surgeon and very honest man, Lilienthal,[13] had to report 21 operative deaths in 34 attempts at lobectomy. It was not until 1932, when Shenstone and Janes[17] of Toronto described their lung tourniquet, that lobectomy became a relatively simple and safe operation.

Let us now leave the past and turn to the present and immediate future. I have suggested that there are problems. One of them is to keep under review the type of training which we demand of the young people who wish to enter our specialty. In both the United States and Canada a group of acknowledged experts has been granted the privilege of deciding what hospital services are capable of providing training in thoracic and cardiovascular surgery, the content and duration of training, the method of testing the candidate's knowledge and, finally, the decision as to whether or not he is qualified to practise our specialty. This imposes on our specialty Board and on the Royal College committee a heavy responsibility to ensure that these young people, who will be our colleagues and successors, are in fact getting the best possible value in terms of knowledge and experience for their years of training.

The situation we are in now is the result of our evolution. The men who ventured into the chest and developed the techniques of thoracic surgery were general surgeons. They dealt with the then operable conditions found within this anatomical region: lesions of chest wall, lung, mediastinum, and esophagus. As cardiac surgery developed, these same men, familiar with the region, skilled in working with large blood vessels and knowledgeable in cardiopulmonary anatomy and physiology, adopted and developed further this new surgical field. Thus, in many centers a concept has arisen of the regional surgeon, rather than the system surgeon, contrary to the way other surgical specialties have developed. In other centers, depending on the interests of individual surgeons and departmental philosophy, a separate cardiovascular service has been formed, the remainder of the thoracic field being the interest of a thoracic service or of the general surgeons. This history is reflected in the make-up of our membership and of our scientific program.

In arriving at a philosophy as to what constitutes an appropriate training in our specialty, or specialties, the American Board of Thoracic Surgery and the Committee for Cardiovascular and Thoracic Surgery of The Royal College of Surgeons reached quite different conclusions. The American Board has continued to emphasize general surgery and insists on preliminary certification by the American Board of Surgery. The candidate is held accountable for knowledge of all surgical conditions in the anatomical area of the thorax but the composition of the required 2 years of training in cardiothoracic surgery is rather loosely defined. No more than 1 year of training credit will be allowed for experience confined to one segment of the field.

The Canadian Committee took the view that experience in such basic common denominators of surgery as wound healing, shock, infection, tissue handling and manual dexterity can be acquired on any major surgical service, including a cardiovascular and thoracic service. They were interested in their candidates having a general knowledge and experience of surgery but shifted the emphasis, in terms of required years of training, toward thoracic and, in particular, to cardiovascular surgery. They were impressed by the time factor required to become expert in the highly specialized diag-

nostic and therapeutic techniques of cardiovascular surgery and were anticipating the probable development of specialized cardiovascular services. By laying down rather rigid requirements for training in this field they wished to ensure that certification would indeed indicate adequate training in this fast-developing branch of surgery.

Our border, which hardly exists as far as nationals of our two countries are concerned, becomes a very real barrier when a surgeon trained in our specialty on one side wishes to practise on the other side. Our Association is the common meeting point of representatives of both certifying bodies. If, by a friendly exchange of ideas, both our training programs can be improved, and the barrier lowered, this Association will have made once again an important contribution to North American surgery.

There is one additional topic to which I wish to make brief reference. It is sometimes said that science has run ahead of philosophy. A surgeon is a scientist, but he must also have a philosophy which guides him in the decision as to when to apply his science to a fellow human being. Powerful therapeutic tools are already in our hands; more are just over the horizon.

We speak of our profession as an art and a science. As our science becomes more sophisticated and we can more and more correct the errors of nature, and challenge what Osler called "the slow gradations of decay," it is increasingly important that we maintain and develop our art.

Our tradition has been to use our skills to extend life and relieve suffering, our only consideration the welfare of the patient. As we come closer to an almost God-like position of being able to control the length of life, it will become more and more difficult to decide just what is in the best interest of an individual patient. Quality of life as well as its length will become a consideration.

At present the guide lines are vague. However, I do think that these considerations are an important part of our dialogue with our residents. They go out into the world superbly equipped with technical skills; they must also carry with them our code of humanity and compassion, those things which make us a great profession and not just highly skilled technicians.

Surgeons have always needed wisdom; in the future they will need it as never before.

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