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EAMS Corner

The Macewen/Kirstein medal of the European Airway Management Society



A B S T R A C T

In 2007 the European Airway Management Society (EAMS) created a medal as recognition for outstanding achievements in airway management, named after William Macewen, Glasgow, and Alfred Kirstein, Berlin, two exceptional pioneers in airway management.

William Macewen (1848–1924) was surgeon at the Glasgow Royal Infirmary and Regius Professor at the University of Glasgow. Being a very innovative surgeon, he introduced aseptic procedures into the operating theatre and performed the first successful intracranial brain surgery for the treatment of brain abscess. He also developed a number of successful operating techniques in orthopaedic surgery.

Macewen planned to pass a tube into the trachea through the mouth. He developed a tactile method by investigations in cadavers, using his fingers to depress the epiglottis and guide the tube into the larynx. In 1880 he described four cases, two with intraoral surgery and two emergency uses of the tube. In these cases he correctly described all principles of tracheal intubation including monitoring of respiration, inhalation of chloroform, awake intubation, protection of the larynx from blood, safe extubation and emergency achievement of a secure airway correctly. After case IV he abandoned the technique, although the tube had worked in all cases in which it was used.

Alfred Kirstein (1863–1922) had worked in internal medicine and learned to use the oesophagoscope, when he worked in the Charite University Clinic in Berlin from 1891 on. He knew that the instrument could sometimes be misdirected to reach the larynx and trachea. After cocaineisation he obtained direct vision of the larynx and trachea. He improved his approach by focussing on the larynx and developing the optimal head position of the patient, without cocaineisation or touching the larynx.

The main intention of Kirstein was to have a diagnostic and therapeutic approach to direct vision to the larynx without too much discomfort for the patient. He developed his own instruments with a tubular blade and later with an open blade, which allowed use of instruments. He called his technique autoscopy. In 1895 he presented the first publication on the new method. His expectations were not fulfilled in the way he had anticipated. However he presented a visionary outlook on airway management and anaesthesiology, for the first time achieving a direct view of the larynx.

This new intubation technique was used throughout the 20th century and thereafter and Kirstein stimulated Gustav Kilian with his approach to the bronchial tree.

William Macewen and Alfred Kirstein laid the foundation for the technique of tracheal intubation under direct vision of the laryngeal inlet, thus paving the way for the method to become a routine technique in anaesthesiology.

The European Airway Management Society has selected these two outstanding physicians and scientists to give inspiration for future discoveries and achievements in airway management, to be honoured with the Macewen/Kirstein medal.

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1. Introduction

After the foundation of the European Airway Management Society (EAMS) in Glasgow in 2003, Ulrich Braun (the first president) and John Henderson (the first secretary) created an EAMS honoraria medal in 2007, to be presented to individuals who had achieved outstanding advances in airway management. They named it after William Macewen, Glasgow, and Alfred Kirstein, Berlin, who were pioneers in airway management. The first presentation was at the General Assembly of the European Society of Anaesthesiologists

(ESA) in Munich in 2007, where the EAMS organized a European airway meeting including hands-on workshop, while acting as a subcommittee to ESA. The medal was presented to Dr. Archibald IJ Brain for the conception and realization of the innovative laryngeal mask airway.

2. William Macewen (1848–1924)

William Macewen was born 22 June 1848 near Port Bannatyne, Isle of Bute, Scotland [1]. He studied medicine at the university of

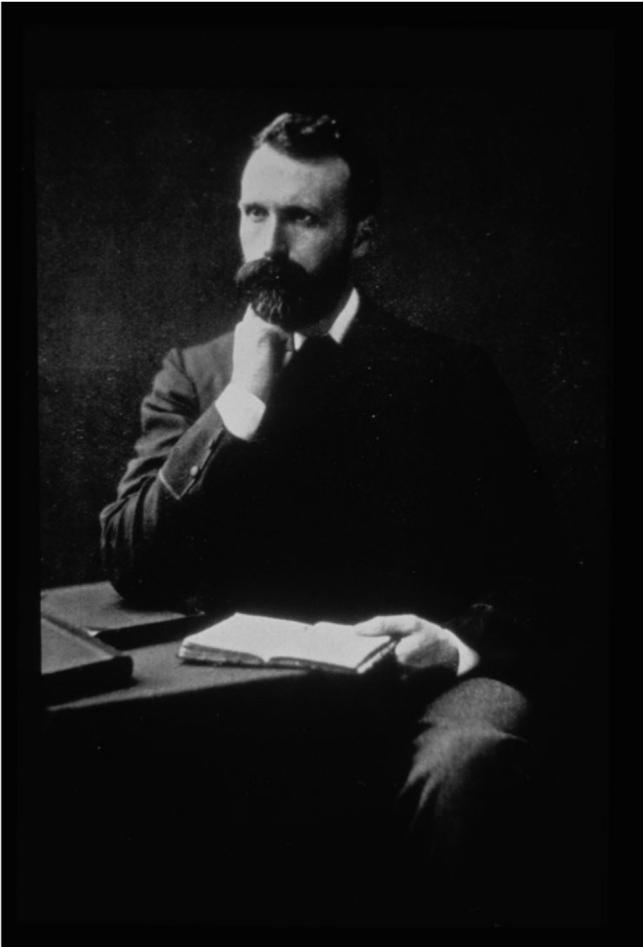


Fig. 1. William Macewen (photograph provided by J.J.H. from Glasgow, source unknown to the authors).

Glasgow until 1872. In 1875 and 1877, he became assistant surgeon and full surgeon at the Glasgow Royal Infirmary. In 1881 he was appointed lecturer on Systematic Surgery at the Royal Infirmary School of Medicine and additionally, in 1883, Surgeon to the Royal Hospital for Sick Children in Glasgow. In 1892 he became Regius Professor of Surgery at the university of Glasgow. Afterwards he transferred his surgical activities to the Western Infirmary hospital in Glasgow.

Macewen was one of the most innovative surgeons of his time [2]. Following Joseph, later Lord, Lister in his post as Regius Professor of Surgery at the university of Glasgow, who laid the foundation for antiseptics, he adopted the use of phenol, scrubbing of hands and arms, sterilisation of surgical tools and use of surgical gowns. He moved from antiseptics to asepsis. He performed the first successful intracranial brain surgery for the treatment of brain abscess and developed a number of successful operating techniques and procedures in orthopaedic surgery. He also designed an artificial limb for Limbless Sailors and Soldiers and contributed to the development of the surgical treatment of hernia and thoracic surgery (Fig. 1).

In 1878 Macewen had been thinking of passing tubes into the trachea through the natural airway instead of using the surgical approach of performing a preliminary tracheotomy to facilitate intraoral surgical procedures. As a consequence of investigations in cadavers he had learned that a metal tube could be passed through the mouth into the trachea by introducing the finger into



Fig. 2. Autopsy by Alfred Kirstein, patient in the sitting position (picture taken from Ref. [5]).

the mouth, depressing the epiglottis on the tongue, and so guiding the tube over the back of his finger into the larynx. Unfortunately the local anaesthetic properties of cocaine had not been discovered and the technique was very arduous for patient and physician. Incidentally the technique of digital intubation may still have a role – J.J.H. has used it to facilitate tracheal intubation in a patient with undiagnosed lingual tonsillar hypertrophy, in which condition direct elevation of the epiglottis is likely to be necessary.

Macewen was knighted in 1902 and appointed honorary surgeon of the king in 1909. In 1880 he described 4 cases of use of a tracheal tube [3]:

Case I: The first operation was removal of an epithelioma from his pharynx and base of the tongue in a 55year old plasterer. A tube was inserted through the mouth as a preparatory measure. Awake intubation before surgery was uneventful except for an expected cough. Spontaneous ventilation, monitoring of ventilation and application of chloroform was possible throughout the procedure. The upper opening of the larynx was stuffed with a sponge to prevent the entrance of blood. After surgery the patient was extubated in an awake state.

Case II: This was an emergency intubation in a 42year old male patient with glottic edema after hot potato contact with the deep

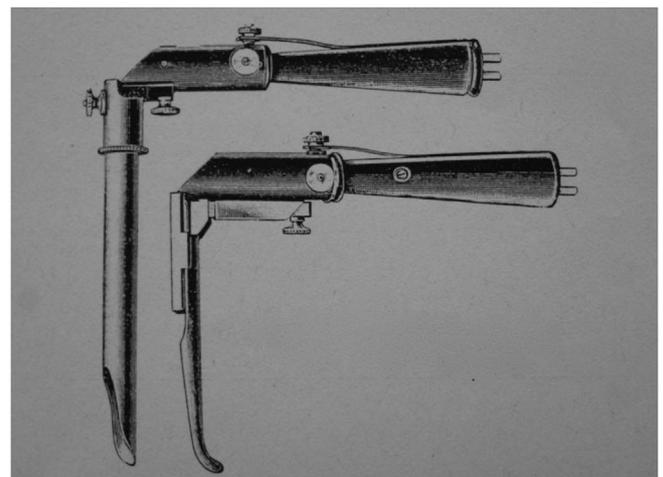


Fig. 3. Instruments designed by Kirstein, with a short tubular blade and later with an open blade (picture taken from Ref. [5]).

pharynx. He sat in the bed, supporting himself with his arms, with noisy breathing and the feeling of suffocation and pain with swallowing. After the first intubation, there was spasmodic coughing for 2 minutes. The tube was held in place for 3×12 hours, after which period the patient made a full recovery.

Case III: A 38-year-old pregnant housewife presented with an acute glottic edema in extreme respiratory distress after a laryngeal affection. The intubation was easy. The tube was left in place for 35 hours, after which she made a full recovery, also being able to give birth to a healthy newborn at the end of her pregnancy.

Case IV: This was a 60-year-old male with an epithelioma. He was an alcoholic with chronic bronchitis. After intubation the patient removed the tube himself, stating that he preferred to take the chloroform without the tube. He died after struggling during induction.

William Macewen planned and observed his airway procedures very carefully. After case IV he did not continue with these investigations, although the tube had always worked when it was used. He correctly described all principles of tracheal intubation including monitoring of respiration, inhalation of chloroform, awake intubation, protection of the larynx from blood, safe extubation, and emergency application. He was the first physician to use tracheal intubation successfully to administer anaesthesia in patients.

William Macewen died in Glasgow 22 March 1924.

3. Alfred Kirstein (1863–1922)

Alfred Kirstein was born 25 June 1863 in Berlin [4]. He studied medicine initially in Freiburg and Strassburg and then in Berlin during his subsequent clinical semesters. In 1886 he passed his final medical examination and received his doctor's degree for an investigation on tuberculosis of the urinary tract. He began his career as assistant physician in internal medicine in Jena and continued from 1889/90 in Cologne. From 1891 he worked in the Charite university clinic in Berlin under the guidance of Hermann Senator. There he was introduced to use of the rigid oesophagoscope by Theodor Rosenheim, who was a specialist in gastrointestinal and later oesophageal diseases. Through his communication with Rosenheim, he learned, that an oesophagoscope can easily deviate from its intended course into the larynx and trachea thus creating an unexpected view of the larynx and tracheal bifurcation.

He was so stimulated by this observation, that he tried to develop the technique of direct visualization of the larynx and trachea after cocaineisation of the mucosa. He obtained direct vision of the larynx and trachea and stated, that the clarity and quality of these images were much superior to those achieved with the mirror. He improved his approach by focussing on the larynx and selecting the optimal head position of the patient. The patient was lying or sitting straight with extended head and the investigator sitting or standing behind him [5]. The instrument was introduced from above to reach the oral pharynx, the deep pharynx and the larynx without entry into the airway (Fig. 2). Thus the larynx, part of the trachea, the posterior surface of the epiglottis and the lower part of the pharynx became visible. Cocaineisation was not necessary, except when the patient experienced intense irritation.

The main intention of Kirstein was to have a high quality diagnostic and therapeutic approach to direct vision of the larynx without too much distress to the patient. He developed his own instruments, initially with a tubular blade and later with an open blade (Fig. 3) and called his technique autoscopia, using Casper's electroscope as handle. In 1895 he presented the first publication on the new method [6]. His expectations were not fulfilled in the way he had anticipated.

What are the consequences of his scientific work concerning direct laryngoscopy?



Fig. 4. One side of the Macewen/Kirstein medal.

1. Alfred Kirstein presented a visionary outlook to airway management and anaesthesiology, for the first time applying a direct laryngoscopic view, which could be used for the purpose of tracheal intubation. This technique was applied throughout the 20th century and thereafter.
2. Kirstein stimulated Gustav Kilian to carry on with his investigations to create a diagnostic and therapeutic approach to the bronchial tree [7].

Alfred Kirstein also invented the forehead lamp [8], later routinely applied in the Ear Nose Throat medical specialty.

In 1903 Alfred Kirstein abandoned medicine and became a painter. He had discovered his artistic talent by playing the piano very well in early years, composing music and developing a love for photography. He intermittently lived in Holland, Paris, Italy and Algeria. Before world war I he presented his paintings in an extensive exhibition.

Alfred Kirstein was a modest, multitalented physician with entertaining qualities and a pleasant personality.

During the war he served his country as physician in Stargard and Stettin. 18 months before his death he fainted in the house of his mother. From then on his health was compromised. He died 02.12.1922.



Fig. 5. The other side of the Macewen/Kirstein medal.

William Macewen and Alfred Kirstein, without knowing each other, have laid the foundation for the technique of tracheal intubation under direct vision on the laryngeal inlet, thus paving the way for the method to become a routine procedure in anaesthesiology. Both had clear concepts of what they wanted to achieve in airway management. Both analysed the problems they needed to overcome and both worked systematically as they developed their techniques. The European Airway Management Society has selected these two outstanding physicians and scientists to give an inspiration for future discoveries and achievements in airway management, to be honoured with the Macewen/Kirstein medal (Fig. 4, Fig. 5).

Conflict of interest statement

UB History of Anaesthesiology, Airway Management, JH Airway Management, History of Airway Management.

There are no conflicts of interest, financial disclosure: none.

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