

The Schimmelbusch mask

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Among the collection of the Hong Kong Museum of Medical Sciences is a piece of equipment that was used by anaesthetists all over the world from the end of the 19th century until around the 1960s. Indeed, it is still used in some resource-poor developing countries after becoming obsolete in the developed world; its use being dependent on the available anaesthetic facilities. This is the Schimmelbusch

mask (Fig).

This mask was originally designed by Dr Curt Theodor Schimmelbusch (1860-1895) in 1890 to administer ether (or chloroform) to anaesthetise patients undergoing surgery. Schimmelbusch was also prominent in his day for studying steam sterilisation and disinfection in surgery. It is a pity he died relatively young at the age of 35 years from

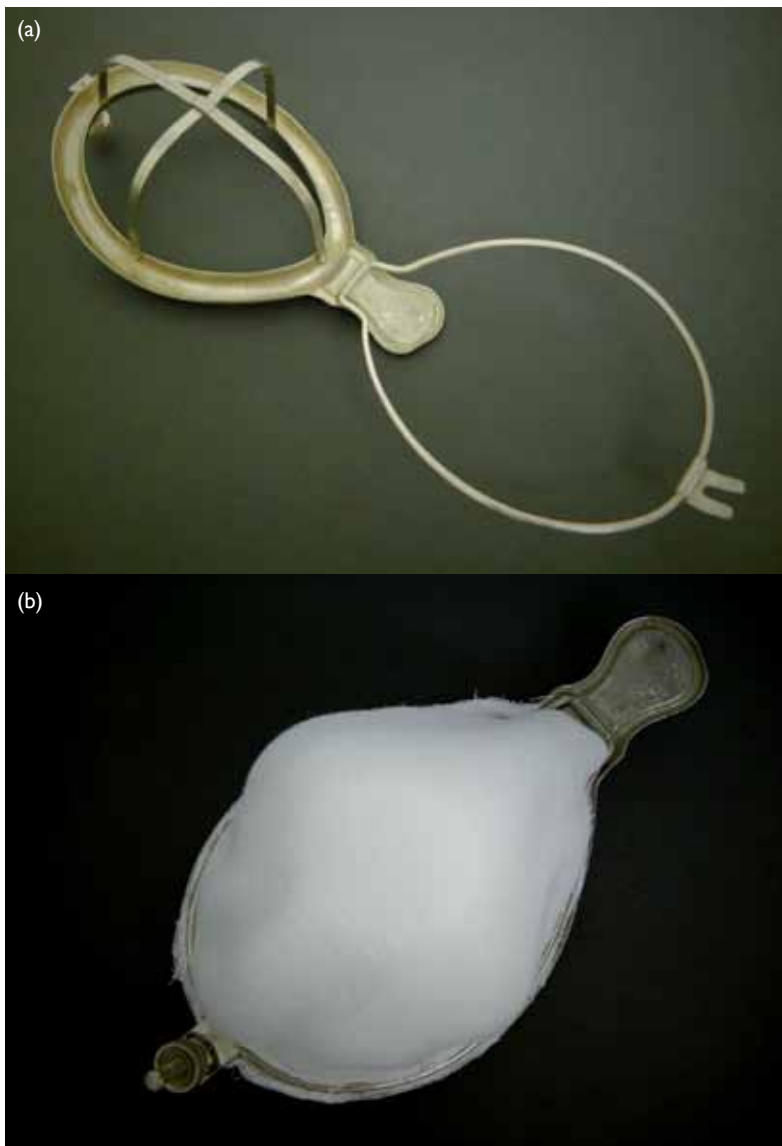


FIG. The Schimmelbusch mask, donated by the Department of Anaesthesiology, Queen Mary Hospital, to the Hong Kong Museum of Medical Sciences in March 1988. (a) It consists of a metallic oval frame with a gutter-like rim surmounted by crossing supports on which rests the Gamgee gauze with the anaesthetic agent, held in place by snapping down of the hinged metallic clamp as shown in (b). The desired amount of anaesthetic agent is dropped onto the gauze and the rim is used to prevent any excessive fluids from spilling onto the face of the patient

tuberculosis. He graduated in medicine in 1886 from the University of Halle (now Martin-Luther Universität Halle-Wittenberg) in Germany. He worked in Halle (on steam sterilisation and wound antisepsis) and Cologne but moved to Berlin soon after. He introduced his anaesthetic mask while working in Berlin, Germany.

Schimmelbusch attempted to improve his original anaesthetic mask design in 1895 but it was not a success; so the original design was used in clinical practice. It has since been modified in different ways but the principle remains the same. The mask rim is designed to fit the contours of a person's face. A frame is constructed over the rim of the mask with 10 to 12 layers of Gamgee gauze (a surgical dressing invented by Dr Joseph Sampson Gamgee in Birmingham, England, in 1880, consisting of a thick layer of absorbent cotton wool held between two layers of absorbent gauze) applied over it and clamped in place during use. This frame keeps the gauze away from the face of the patient to make it more comfortable and acceptable for the patient. There is a gutter that runs around the rim to catch excess anaesthetic liquid so that it does not drip onto the patient's face and irritate the patient—this is a desirable characteristic as an irritable patient might contribute to stormy induction of ether anaesthesia.

When used, the mask with Gamgee gauze in place is applied to the face of the patient. It covers the nose and mouth while the liquid anaesthetic (either chloroform or ether) is dropped onto the gauze. The patient, thus, breathes through the gauze and inhales the vapours of the anaesthetic. The control of the anaesthetic dose and speed of onset of effect are dictated by the anaesthetist controlling the amount and rate of the liquid anaesthetic being dropped onto the gauze. Ongoing anaesthesia is maintained at the desired level by continued

administration of the liquid anaesthetic onto the gauze, as appropriate.

The mask is classified as a semi-open anaesthetic breathing system (circuit). As the mask increases the anatomical dead space for breathing, it causes an increase in the patient's minute volume ventilation in an attempt to compensate for the reduction in alveolar ventilation. This physiological ventilatory enhancement hastens the vaporisation and inhalation of the anaesthetic and is conducive to a quicker and less stormy induction.

The Schimmelbusch mask was probably used in Hong Kong soon after its introduction to clinical anaesthesia in the western world. As ether and chloroform anaesthesia were prevalent in Hong Kong from the early colonial days, with the first recorded surgical operation performed on 18 March 1848 by a British surgeon employing chloroform anaesthesia, it is conceivable that the mask was generally used for the purpose in Hong Kong since its invention and introduction. Ether and chloroform were superseded by the introduction of barbiturates (pentobarbital and methohexital) for intravenous induction of general anaesthesia and the use of inhalation anaesthetic agents like trichloroethylene, and then halothane, for induction or maintenance of general anaesthesia in the 1950s. The mask was superseded when new anaesthetic machines and breathing circuits were designed after the Second World War to vapourise and deliver volatile anaesthetics, eg the Epstein-Macintosh-Oxford (EMO) ether anaesthetic apparatus (1956), and the Boyle's series of Anaesthetic Machines (1950s to 1990s)—a British anaesthetic equipment often used in Hong Kong at the time. The EMO remained a back-up for the more modern anaesthetic equipment (and for anaesthetic training) in Hong Kong until the 1970s when they were completely retired from service.