History of mouth-to-mouth rescue breathing
Part 2: the 18th century

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Abstraction

In Britain, the great boost to performing mouth-to-mouth resuscitation for the “suddenly apparently dead” came from William Tossach’s 1744 documentation of his own successful case, and then from promotion by John Fothergill and other enthusiasts. Some civic authorities on the Continent were exhorting citizens to employ it from as early as the mid-18th century. The first humane society was founded in Amsterdam in 1767 and initially promoted expired air ventilation (EAV) by the mouth-to-mouth method. Other humane societies were soon established throughout Europe, especially in maritime cities with frequent drownings. The founding of London’s humane society in 1774, initially known as “The Institute,” was followed by earnest efforts to promote mouth-to-mouth EAV in England, and soon after in Scotland, but not until the 1780s in North America. Disenchantment with the mouth-to-mouth method as less desirable (for various reasons) led to decline in its general use. In 1782, what later became The Royal Humane Society in London changed its expressed preference for artificial ventilation by mouth-to-mouth to manual artificial ventilation using inflating bellows, although mouth-to-mouth was a method of resuscitation which could be attempted by any rescuer. The need to apply artificial ventilation immediately was not really recognised before John Hunter’s recommendation to London’s Humane Society in 1776. Charles Kite spelt out clearly the principles of resuscitation in 1787–8, though he gave some priority to warming. It seems that only in the latter part of the 18th century was the importance of airway obstruction recognised, largely due to Edmund Goodwyn.

Advent of mouth-to-mouth expired air ventilation during this era

William Tossach delayed documenting his successful intervention of 1732 until 12 years later. Yet, as noted by L Brandt and his Mainz colleagues, between 1732 and 1744 there were written exhortations to resuscitate using traditional empirical methods, initially without specific respiratory assistance. Such a call came from the anonymous “Philanthrope” in the monthly Mercure Suisse of November 1733, concerning rescue from drowning; and then, in 1740, in a report Avis concernant les personnes noyées, qui paraissent mortes, ostensibly from the hands of Louis XV but actually written by physiologist/physicist René de Réaumur. Next, “Academicus curiosus”, the anony-

FN1. This account will not try to distinguish between the words “drowned” or “drowning”, when they are used for a fatality, and “near-drowned” [etc], where that modern day expression would apply.

FN2. And further, P J Bishop’s Short history of the Royal Humane Society’ quotes the Society’s 1901 report, for a letter the Society had received citing the Professor of Philosophy at Neuchâtel 1705–1742, one Bourquet, as the first to initiate “methods for recovering persons apparently drowned”. Bishop could not elicit any further details.
mous translator of the 1742 German (Hamburg) version of the Avis, now introduced to his account an advocacy of mouth-to-mouth resuscitation. So even before Tossach’s paper appeared, the mouth-to-mouth manoeuvre was certainly known in Europe (see also Part 1). Brandt et al note further that “within a few decades [of these 1740s publications] the idea of resuscitation of casualties spread all over Europe.”

Midwives, in their isolation from the medical profession, were meantime likely to be applying mouth-to-mouth expired air ventilation (EAV), practised from before 1472 and the time of Paolo Bagellardi when required for neonatal resuscitation, as was also outlined in Part 1. But as Joseph Redding has explained: “... the technique was considered inelegant and undignified by physicians, who felt it was beneath their notice and of little concern to them”. Thus, in 1776, “William Hunter spoke of mouth-to-mouth inflation as the method practised by the vulgar to restore stillborn children”.

William Tossach and John Fothergill

In 1744 at Edinburgh, William Tossach presented the case study of his mouth-to-mouth rescue, witnessed by “many Hundred People, some of them of Distinction”, he then published it in a small pamphlet. On first reading Tossach’s account, London physician John Fothergill (1712–1780), Edinburgh alumnus and Quaker, was immediately and evangelically enthused by the “Possibility of saving a great many Lives” through mouth-to-mouth. He carried that message to the highly influential Royal Society of London, extolling mouth-to-mouth as immediately available, simple enough for the unskilled to administer, inexpensive and harm-free. In an impassioned address which he “Read 21 Feb 1744–5” to the Royal Society, Fothergill also contended that malefactors, immediately following their execution at the gallows, could provide scientific study opportunities on how to assist others asphyxiated, by suicidal hanging for instance. The Royal Society dismissed topics it saw as too far outside its interests. Nonetheless, Fothergill tirelessly promoted Tossach’s method, and other British enthusiasts and European converts followed his lead. For several decades, he was the advocate and probably the foremost exponent in Britain, possibly in Europe, of EAV.

Fothergill’s ideas on resuscitation appeared in Philosophical Transactions of the Royal Society of London (“Philosophical”, because scientists were known as natural philosophers). After dismissing futile measures such as “bleeding” and other measures similarly “ineffectual,” Fothergill listed the singular advantages of mouth-to-mouth EAV over bellows for resuscitation:

... but; if any Person could be got to try the charitable Experiment by blowing, it would seem preferable to the other [ie, bellows]:

1) As the Bellows may not be at hand:
2) As the Lungs of one Man may bear, without Injury, as great a Force as that of another Man can exert; which by the Bellows cannot always be determin’d:
3) The Warmth and Moisture of the Breath would be more likely to promote the Circulation, than the chilling Air forced out of a Pair of Bellows.

Fothergill wrote that it had been suggested to him that “a Pair of Bellows might possibly be applied with more advantage in the case of a Man’s Mouth”, but he expressed preference for the mouth-to-mouth method, with its warmed air. Although Elizabeth France saw Fothergill as fearful of the dangers from bel-

FN3. Maureen McNeely reminds us, at the beginning of the 18th century, “midwives were not considered members of the medical profession in Britain. As more ... famous medical men such as William Hunter and William Smellie took up work in this field, midwifery was given increased institutional and professional recognition.”

FN4. And then, according to David Schechter, 1969 — but to him alone it seems — Tossach presented his paper again next year, when Schechter says he addressed the Royal Society of London. But Ross MacFarlane, Assistant Archivist at the Royal Society, can find no evidence for this claim (personal communication).

FN5. Re “Feb 21, 1744–1745”, Ross MacFarlane of the Royal Society explains (personal communication) that the 2 years, 1744 and 1745 (each of which Fothergill supplied — in tandem — for dating the year of a February 21 reading of his paper), refer to whichever date is taken as the first day of a new year. In Britain before 1752, New Year’s Day was on March 25, so for this paper, alternative dates are possible and valid — if perhaps confusingly: one of 21 February 1744 (in Julian, Old Style) and one of 21 February 1745 (in Gregorian, New Style).

FN6. Fothergill described the popular rationale for such a curious action — as it must seem to us today — thus: “to give vent to the stagnating Blood in the Vein, in order to make way for that in the Arteries a tergo, that the Re[spir]ation of the Heart being thus diminished, this Muc[ous] might again be put in Motion”. At times, attempts at bleeding the victim seem to have been withheld until there was first some detectable sign of a recovering pulse.

FN7. Surely a 1740 date indicates this “Fothergill” of Fisher’s was John? (no relation of Anthony’s). I am sceptical that even after “1740” is corrected to 1745, he could — from his birthdate — be Anthony (1737-1813). So, I take it that the reference had to be for the contemporaneous John F. Even so, Fisher’s dating of 1740 (which can hardly be correct either?) is before Fothergill could be aware of William Tossach’s rescue, which was not until 1744-5. Fisher’s oft-quoted paper has several errors scattered among its many pearls, so acceptance of his unreferenced statements at face value has to be made with great caution. The only citing Fisher has of Fothergill in his list of references (a list both long and valuable, but unfortunately incomplete) is for Fothergill’s reprint year of 1774. Fothergill’s brother Samuel F, guardian to John Coakley Lettsom (1744–1815), was of Fothergill’s own era. Perhaps Fisher just mixed up John and Anthony.
lows, he did invent a set of inflating bellows. RJ Cary, without providing evidence, considered bellows "to have been first used on a human being by Dr John Fothergill of London, about 1750." Hart Fisher, also without referencing, details how the “Anthony Fothergill Method (1740)”, using cupped hands, avoided actual mouth contact in EAV: either by applying the technique Fisher specifies; or by leaving mouth-to-mouth to "charitably inclined" others. Under “John Fothergill Method (1774)”, Fisher reports Fothergill, despite his stated preference for mouth-to-mouth, “not relishing its performance”.

Fothergill advocated extending EAV to “...A Physician...” not relishing its performance”. For the drowned, he recommended that, following measures delivered “with the utmost expedition” to first discharge imbibed water from the body, a trial of EAV be attempted. (When Fothergill’s papers were reprinted in 1774, the editor of Philosophical Transactions said the value of rolling the patient on a barrel was “now deservedly exploded”. It does not appear that compressing the chest or abdomen with the free hand during mouth-to-mouth was advocated at this time, although randomly pressing on the chest was used in lay attempts at rescue.

In Fothergill’s oft-quoted, mechanistic illustration likening the absent breathing of the drowned to a stilled pendulum in a clock in good repair and wound up, both needed just “some impulse” to be set in motion.

Other early promotions of mouth-to-mouth EAV

Around this time the scholarly physician Richard Mead (1673–1754), when updating the 1745 edition of his book A mechanical account of poisons, in several essays, encouraged resuscitation attempts with “the use of all means available”, even after drownings of “many hours”. Those means did not include any specific respiratory assistance, such as mouth-to-mouth. However, a “very accurate description” of mouth-to-mouth technique appeared in A physical dissertation on drowning (London, 1746/7), by “A Physician,” widely considered to be Rowland Jackson (1720–1784). A B Baker deduces that this account was “not from personal experience”.

Giovanni Tozzetti (1712–1783), named the foremost Italian resuscitationist of the era, was likely the authority behind the anonymous 1752 directive, given under Florentine royal decree, pressing citizens to learn resuscitation. TF Dagi declares that Florence was one of the first cities to attempt public involvement in such rescues. And he also finds that a 1773 tract of Tozzetti’s indicates that, in Europe, “physicians learned resuscitation from laymen at the water’s edge”.

Sometime between 1733 and 1747, surgeon and “man-midwife” Benjamin Pugh introduced his methods of resuscitating the apnoeic newborn. In his 1754 Treatise of midwifery — written after 14 years of obstetric practice, but failing to gain funding for publication in 1747 — he described his special air-pipe: “...a small common wire, turned very close (in the manner wire springs are made) ... covered with thin soft leather”. It was to be inserted through the mouth, blindly by touch, “...as far as the larynx” or “...at the larynx”, initially for relieving asphyxia with the after-coming head during difficult breech birth. G M White stated, however, that the tube was inserted into the larynx, after which “...the operator then blew down the tube intermittently” (ie, supplied mouth-to-tube EAV). Pugh wrote “...by this method of giving the child air, I have saved great numbers of children’s lives, which otherwise must have died”. If the clinical problem was solely a respiratory one, of establishing a clear airway, once Pugh had developed an alternative relieving technique with fingers and palm alone, his tube became largely unnecessary. (Those incredulous at all this can find more detailed descriptions in references 25–26.) But, for an apnoeic newborn, Pugh advocated EAV by mouth-to-mouth: press your mouth to the child’s, at the same time pinching the nose with your thumb and finger, to prevent the air escaping; inflate the lungs, rubbing it before the fire: by which method I have saved many.

Obstetrician William Smellie endorsed artificial ventilation in his 1752 midwifery Treatise. Buried within the book’s 454 pages is the revelation “… and the child has been sometimes recovered by blowing into the mouth with a silver Canula [a female catheter], fo as to expand the lungs”. Smellie documented saving newborns with his mouth-to-tube technique.

In 1762, the Authorities of the City of Hamburg formulated a plan for the drowned, offering rewards. Herholdt and Rahn’s account states, “...the people still adhered to the Prejudice that it was degrading to touch those who had died an Unnatural Death.” So in 1765,
the soldiers of the city garrison were ordered to employ “all possible Diligence” to rescue the drowned, but Herholdt and Rafn do not say whether that included EAV by mouth-to-mouth.

Joseph Black’s 1756 documentation of his (1754) discovery that exhaled breath contained “fixed air”, regarded as “poisonous” and later identified to be the gas carbon dioxide (CO₂), led to assertions in 1906 from Robert Woods¹⁰ that, around this time, “the immediate insufflation, or mouth to mouth method, was employed exclusively”, and that, from this discovery of CO₂, “deductive reasoners … deduced that immediate insufflation was dangerous … a grave physiological error”. Woods’s claims appear unsubstantiated.

Contrary to Woods’s opinion, an “Official ‘Edict’ by the Chancery Office of the City of Zürich”,³¹ dated 26 April 1766, described, among other things, details for a mouth-to-mouth technique, thereby disarming Woods’s above claim. The Edict’s instructions indicated the limited understanding of priorities for resuscitation, but they did exhort citizens to continue resuscitation attempts as long as “even for one or two hours”. The initial instructions were for:
1. Changing wet clothes for dry and warm ones;
2. Expressing ingested water, blowing “useful” tobacco smoke through mouth and nose, and promoting vomiting;
3. Warming the body. Then:
4. “In the meantime, one must not neglect to stimulate the body, particularly the lungs, stomach, and intestines in all possible ways.” Only after a detailed description of technique for “pre- eminent” tobacco, by smoke or clysters, both of these “into the lower body”, does Instruction 4 suggest EAV. “If the mouth is open it is appropriate to blow air into it if someone pinches off the nose, puts his mouth tightly over the mouth of the drowned then blows hard”. If all else failed, including jugular phlebotomy (“of great value”), “have a skilled surgeon open the trachea and have air blown into the opening”— presumably by mouth-to-tube EAV.

Later that year, a surgeon at “Corke” (Ireland) did precisely that: “Mr Glover made an incision through the skin in the windpipe … and blew strongly through a canula into the lungs” of a man who had been hanged for 29 minutes and “showed no signs of life”. The robber-tailor survived “some years after, apparently in good health”.³²

1767, spring: the first humane society, Amsterdam⁵,¹⁷,²⁹,³³-³⁷

Mouth-to-mouth EAV made a significant advance for attempted resuscitation of the drowned, when wealthy philanthropic merchants of Amsterdam formed Europe’s first humane society, with 10 directors. FN9 This was the Society for the Recovery of Drowned Persons, to inform the common people and to animate them, as RJ Cary¹⁷ phrased it, and rescue those too frequently discovered in the city’s canals. But whichever measures were to be applied, before a drowned person could be resuscitated he or she had to be extracted from the water. Much careful planning went into the design, manufacture and placement of rescue equipment;²⁹ for example, Brash of Hamburgh’s successful “seeker”, paired catching forceps, ladders to lay on the ice, boats, and carrying baskets. Although it seems that tobacco fumigation was prioritised originally,² the Dutch methods³³-³⁶ did include mouth-to-mouth EAV;FN10,³⁸ which is hardly surprising considering, as Douglas Chamberlain states,³⁶ John Fothergill was influential in the foundation of the Dutch society. After effecting lung inflation, the mouth-to-mouth rescuer “produced expiration by compressing the abdomen with his free hand”.³³ David Ramsay²¹ considered that the Society’s success, with 150 saved in the United Provinces in its first 4 years, followed from its understanding of the need for a rational plan “for reanimating the collapsed lungs”.

A comment on mid-18th century resuscitation priorities²

Looking back at the relative importance given to 18th century measures employed for the asphyxiated, we would expect immediate resuscitative aims to be: i) establishing compensation for deficiency in natural breathing, and restoring it; and ii) ensuring re-oxygenation of the patient’s

FN9. Some authors foster a legend that the Amsterdam Society’s 1767 inauguration occurred in the same year that René de Réaumur read a paper to the Académie des Sciences in Paris concerning “some instances of apparent recovery” from drowning, after several resuscitation attempts in Switzerland (likely by de Réaumur’s own interventions).¹² Elizabeth Thomson⁷ states that he presented his finding “That year” (ie, 1767, whereas he had done so in 1740). But de Réaumur (1683–1757) was already dead. Perhaps she followed Schechter’s 1969 statement to the same effect,¹⁴ which he supplied without providing his source for it.

FN10. Evidently a few authors do not accept that, at the start of their Humane Society, the Dutch had incorporated mouth-to-mouth EAV into their resuscitative efforts. Peter Karpovich³⁸ says bluntly, “Mouth-to-mouth insufflation was forbidden”. And although RJ Cary¹⁷ has it that “Further, if the bellows were not at hand, the trial was not to be made with the breath of the operator, which “has become obnoxious and unfit to enter any lungs again””, he does allow that the Dutch had made some use of mouth-to-mouth. These writers could not have gone back to the earliest of the Dutch records for a correct quotation.
vital organs, prime considerations being to secure airway patency and to provide artificial ventilation. Physiologic investigators of the 16th and 17th centuries had already clearly demonstrated the need for such measures in their animal experiments. Vesalius — who clearly recognised the problem of soft tissue obstruction of the airway12 — had decreed: “…take care that the lung is inflated at intervals, the motion of heart and arteries does not stop”.12 But common belief and practice in the 18th century still did not emphasise urgency for re-establishing natural breathing; rather, the highest priority was for restoring bodily warmth and dryness. So artificial ventilation had to take its chance among the resuscitative methods advocated.

In the decades after 1744, attempting to compensate for inadequate breathing was not topmost in any list of interventions; in fact, most resuscitative measures were thought to have equal efficacy.39 Restoration of breathing was sited either randomly within such a list, or low down. Much time was wasted on manoeuvres then thought necessary for the asphyxiated, but later determined to be useless (shaking, shouting, thumping or compressing the chest, tobacco by fumigation or clysters, blood letting, “barrelling”, inversion, emetics, aromatic stimulants and smelling salts, intestinal distension, etc, etc — all due for eventual condemnation by humane societies). Some might have used hand pressure on the chest to produce an exhalation, following which, passive recoil of the chest wall could produce a limited inspiration. The marvel is that there were so many documented instances, particularly once humane society records became regular, of asphyxiated people with seemingly unequivocal signs of lifelessness, restored to a good recovery after prolonged resuscitative efforts — without what we would regard as effective breathing rescue. Accounts and claims of achievements that the humane societies received were studied carefully — but of course were not subject to 20th and 21st century-type audit processes. Some accounts were too far-fetched, precluding any acceptance.

Benefit from the Amsterdam Humane Society’s promotions was quite early demonstrated in its report of 26 November 1768 of “19 Victims, only in the Dutch provinces, who had been saved by the recommended Measures within the space of 14 months”.29p 3] And R J Cary17 can quote from translated memoirs of the Amsterdam Society, wherein the detailed reporting of four of the successful resuscitations from drowning in 1769 has only a single, brief “respiratory” mention — one, probably not of EAV by mouth-to-mouth, but of “wind forced into [the] mouth [of a boy of 14 years], while his nose was held closed and this was repeated”. However, despite initial endorsement of EAV by the Amsterdam Humane Society, their preference was already switching to using bellows, on grounds that the breath of the operator was “obnoxious and unfit to enter any lungs again”.17

Other humane societies5,17,34-37,40

Many cities, maritime or with rivers, quickly followed the lead of Amsterdam’s Humane Society and formed similar learned bodies, first at Rotterdam, then other cities in Europe and around the world. FN11 Although a comparable society for London was not founded until 1774, it was soon to the fore in systematic research in resuscitation and in documentation. Humane societies developed to encourage and teach, and to document, publish and disseminate knowledge, including information about known resuscitation attempts. (A humane society was not functioning effectively in the United States until the 1780s.40) In many countries, humane societies established Rescue Stations and Receiving Houses (there were 11 in London37); awarded medals, gave rewards for genuine saves or valiant attempts, and compensated helpers.

In Paris, L’Académie des Sciences issued its Edict of recommendations in 1770;29 and Lord Cathcart41 reported that between 16 June 1772 and 25 March 1773, 23 of 28 people “taken from the Seine” were restored to life. Simon-André-D Tissot (1725–1797) apparently preferred mouth-to-mouth with its warm breath (1774) (Fisher18 does not reference his source for this statement), although he later reverted to bellows for inflation of tobacco smoke.

Because cooperation from lay people could be lacking at accidents, it was towards them — the ones likely to be on the spot — that humane societies directed their strategies, offering the encouragement of graded financial rewards for attempting resuscitation of victims suddenly apparently dead, especially from drowning. Although it seems that, originally, tobacco fumigation was prioritised — as can be confirmed from William Buchan’s 1769 textbook42 — lay people were now being encouraged to provide EAV by the mouth-to-mouth method, although their enthusiasm was already starting to diminish.2 And importantly, for a long time, failure of mouth-to-mouth resuscitations could often

FN11. Many, including Herholdt and Rafn,29 Carolyn Williams;5 for instance, mention Vienna, Saxony, Milan, Padua, East Indies, America, Algeria and Denmark. Others were established at Hamburg (1768), Paris (1771), Dresden (1773) and St Petersburg (1774). By 1780, the United States had its first humane society in Philadelphia5,40 (one not really active until 1787), then a humane society for New York in 1784, and at Boston for Massachusetts in 1786.40 Glasgow’s humane society was founded in 1790.34
be attributable to inability to recognise obstruction of the airway (but see Edmund Goodwyn, 1782–1788, in the section Mouth-to-mouth EAV towards the end of the 18th century in Britain on page 169).

1769: William Buchan (1729–1805)

Only 2 years after the Amsterdam Society’s inauguration, further dissemination of knowledge about mouth-to-mouth is demonstrated in the very first edition of William Buchan’s Domestic medicine (1769).42 (The 22nd edition from 1828 appears to be the last British printing available on Internet sales; one bookseller describes Buchan’s “selling 80 000 copies during his lifetime”). Under “Of Casualties”, Buchan suggests for “Persons [sic] who have the misfortune to fall into the water … often given up for dead, … [to] restore the natural warmth, and renew the circulation and breathing”. So, strip, rub, warm, bleed. Then a paragraph suggests EAV by mouth-to-mouth:

In order to renew the breathing a strong person may blow his own breath into the patient’s mouth with all the force he can; [But then] … or, what will generally succeed better, the smoke of tobacco may be blown into the lungs, by means of a pipe or funnel … [presumably, bellows also]. [And it will be] proper to throw up the smoke of tobacco into the intestines.

But like so many advising from the sidelines, he indicates no personal experience or evidence for his advocacy — other than that he has known of “a pig drowned and restored to life two or three times successfully, by blowing air into its mouth with a pair of bellows”.

Buchan’s respiratory advice by his 8th edition (1784) was still promoting mouth-to-mouth for EAV.

1774, April 18: a humane society in London

Alexander Johnson19[nos.27&29] insufficiently credited pioneer and promoter of resuscitation, summarised the ideas, methods and annual reports of the Dutch Society for the years 1767–1771 in his 1773 pamphlet Short account of a society in Amsterdam instituted in the year 1767 for the recovery of drowned persons.6,43 This brought to Britain the first documentation of the idea for an English humane society comparable to the Dutch one.43 The situation in England around this time is summarised thus: although occasional reports of successful resuscitation attempts had appeared in the medical press for several decades, there was no systematic attempt to introduce such practice on a regular basis.

As most doctors were largely not involved in such undignified activities as resuscitation, Johnson wanted knowledge of it to be taken up at all levels of society, with the ability of “all classes” to intervene, not just doctors.19[no.29] Johnson’s attempt in 1774 to form The General Institution, his own humane society, failed.43 But his précis appeared at the very time Dr (the Reverend) Thomas Cogan’s Memoirs of the society instituted at Amsterdam in favour of drowned persons. For the years 1767, 1768, 1769, 1770, and 1771 (a literal translation of the Amsterdam Society’s proclamation of 1767/1773) “was ready for the press”.19[no.28] A London apothecary, William Hawes, had been making rescues from drowning in the Thames using the Dutch methods, presumably including EAV by mouth-to-mouth. He rewarded other rescuers for their reports of life-savings and attempts, but such were the times, out of his own pocket.13 When he read Cogan’s memoir, his enthusiasm was fired to improve the success rate of recoveries.

After intense efforts by Hawes and Cogan together, and with the latter’s protégé John Lettsom (another of the community of Quaker physicians and founder of The Medical Society of London, in 177320), they organised An Institution for Affording Immediate Relief to Persons Apparently Dead from Drowning43–44 (usually referred to as The Institute), with its first recorded meeting taking place on 18 April 1774.19[n2] Posthumous member Dr Oliver Goldsmith’s name was honoured, but although several 20th century writers include him as being present, he had died on 4 April. It contained many benevolent, earnest, lay enthusiasts as well as doctors, at a time when other doctors who were previously unwilling would now be forced to take notice. The Institute’s recorded Case No. 1 was dated 12 July 1774. Then, 4 days later, after plunging onto flagstones from “a one pair of stairs window”, and “to all appearance dead”, 3-year-old Catherine Sophia Greenhill was eventually revived (by apothecary Mr Squires’ electric shocks, probably a first).43–44

William Hawes19[n13] was a tireless worker and fund-raiser for the cause (“demonic … obsessive”13), producing the society’s annual reports, annual anniversary sermons, fold-
Alexander Monro Secundus (1733–1817)

Experiments carried out before August 1774 by Edinburgh's famed anatomist/physician Alexander Monro Secundus, "a ccertaining the beft manner of inflating the lungs of drowned persons", enabled him to establish definitive, successive techniques. William Cullen, His Majesty's First Physician in Edinburgh and Professor of Physic, wrote of being "informed" that Monro's preference, when using his "wooden pipe" to facilitate artificial ventilation, was to insert the tube into one nostril rather than into the mouth. Monro could then insufflate the victim's lungs, either by blowing "beneficially warmed" expired air down the tube [mouth-to-tube], or by attaching bellows to the tube. Meantime, the operator observed the adequacy of inflation by "the raising of the chest or belly". (Monro's bellows apparently had a capacity of c. 1500 mL.)

If ventilation was inadequate, then "introduce directly into the glottis and trachea a crooked tube" (a metal, male catheter) by employing a blind technique of tactile intubation which Monro carefully detailed, meanwhile preventing air from entering the stomach (one of the hazards of the technique) by pressing "the lower … larynx back onto the gullet". Inflation, whether by mouth-to-tube or by bellows, was to be followed by "breast and belly" compression to actively deflate the lungs. It can be noted, further, that Monro’s introduction of a method for adult translaryngeal intubations — named as such here, because at those times many intubations did not extend into the trachea — represented a real advance in enabling lung inflation by those capable of carrying out such manoeuvres, in circumstances where that was possible.

His intubation technique is also widely quoted as "mentioned by Mr Portal [Baron Antoine Portal (1742–1832)], Mr le Cat … [though M Claude-Nicholas Le Cat (1700-1768), note, may not have performed it] … and others". And it furthered the evolution of endotracheal intubation — yet Richard Lee could declare (in 1972) that Monro’s endotracheal intubation “apparently did not find wide application”. Contrary to Lee’s comment, William Buchan was invoking Monro’s advice by his 8th edition of Domestic medicine (1784) [if not earlier?] as also others later, among them James Curry (1781), Charles Kite (1787), Edward Coleman (1791 and 1802), and Herholdt and Rafn (1796).
1774, Aug 8–11: William Cullen (1710–1790) and [Lord] Charles Schaw Cathcart (1721–1776)

Lord Cathcart had noted the successes of humane societies in Europe, so sought advice from William Cullen as to what would be applicable for Scotland. Cullen incorporated the details of the Monro recommendations and methods for resuscitating the apparently drowned into a 27-page response, A letter to Lord Cathcart, President of the Board of Police in Scotland, concerning the recovery of persons drowned and seemingly dead. Cullen’s letter was dated “8th August 1774” (not even 4 months after the first official meeting of The Institute), whereas the year usually quoted for it is Sir Arthur Keith’s 1909 dating of “1776”, the year during which Medical Tracts published the Cullen letter in London. This “letter” is justifiably famous, among many other things, for publicising Monro’s step-by-step description of how to intubate the trachea. It has also been criticised because, for the first manoeuvre, it favoured “recovering the heat of the body”, not immediate attention to ventilation and heart function (compare John Hunter, 177649). William Hawes had also requested such guidance for The Institute in London, but it appears Cullen sent the advice only to His Lordship.

The prime objective which Cullen emphasised (in response to Cathcart’s “asking my opinion”) was “To restore the heat of the body [to stimulate what he consid- ered the “vital principle”], … while … at the same time, … restoring the action of the moving fibres”, and “While [doing that] and especially after … compleat and finish the bufliness by restoring the action of the lungs and heart”. Artificial ventilation was recommended, not by applying mouth-to-mouth, but using a Monro method: with a wooden tube in a nostril and either mouth-to-tube EAV, or bellows-to-tube artificial ventilation. The Monro technique for intubation was then described, should that action be needed. Cullen also strongly supported rectal tobacco smoke, as many others still did.

Lord Cathcart immediately produced his own paper, The recovery of persons drowned and seemingly dead, dated 11 Aug 1774, with his recommendation of the sequence of actions needed for resuscitation. After initial (but time-consuming) manoeuvres of securing and drying the victim, then supplying warmth, “the first and most efficacious … stimulating method” was EAV by mouth-to-mouth (which Cullen chose to omit — or else vetoed). He decreed: “… blow with force into the lungs, by applying the mouth to that of the patient … and gently expelling the air again, by preffing the chefft with the other [hand], imitating the strong breathing of a healthy person”. There is caution against abandoning treatment at less than 2 hours. Also, “opening a passage to the lungs through the wind pipe … must always be left to the judgement of a surgeon”.

FN15. Lord Cathcart emphasised that no country’s need was more likely than Scotland’s, where drowning danger “calls more loudly for effectual measures.” He saw his advice as applicable to “… persons drowned, strangled, frozen, or suffocated by noxious vapours.” M Anne Crowther, in a generous reproduction of the original papers on a website of the University of Glasgow, re-emphasises that for Scots no-one is ever far from deep water, and drowning is always a serious possibility.
1774: EAV by mouth-to-mouth in Scotland

Lord Cathcart's paper included the Resolution\(^\text{41}\) from the meeting of the Board of Police, Scotland, dated 11 Aug 1774, “That printed copies of the Minutes of this meeting be fixed upon the church doors, in the market place, and other proper places, in each parish within the hire”. If, as is usually written, it had been solely Cullen’s letter that was to be posted, the Scots populace would not have received advice to first try mouth-to-mouth EAV, omitted in Cullen’s letter but included in Lord Cathcart’s paper, as Cullen’s recommendation for EAV was mouth-to-[nose]-tube alone. These promotions not only exemplified the enthusiasm for encouraging resuscitation among lay people, as well as doctors, it presented mouth-to-mouth EAV to well-nigh the whole population of Scotland.

A Minute within an “Extract” from the Journals of the Board of Police, Scotland,\(^\text{50}\) of the same 11 Aug date, recorded that Lord Cathcart, and the Earls of Lauderdale and of Leven, “Ordered” the “aid paper [Lord Cathcart’s] and letter [William Cullen’s]” be printed and distributed countrywide. The Minute also reveals that each Sheriff, Magistrate and Moderator was directed to keep a Register of rescue, and to supply a boxed recovery kit with a fumigator, “FOUR wooden pipes, for blowing into the nostrils”, a pair of bellows, and vials of smelling spirits (total cost, £1/9/6). It can be noted that Cullen approved drawing jugular blood from the drowned but only if done early, while Cathcart’s advice was that phlebotomy “becomes particularly necessary” as recovery occurs.

1776: John Hunter (1728–1793) and the Humane Society\(^\text{49,51}\)

In responding by way of a scientific dissertation to a request for advice on resuscitation from William Hawes, John Hunter reported\(^\text{49}\) his earlier 1755 experiments on a dog, employing his double-chambered (inflating/sucking) bellows with the nozzle inserted into a tracheal slit, followed by comparable “Proposals” for the human drowned. Hunter appreciated that some of them, although apparently dead, were in a “suspended animation” from which they might recover with proper attention. He recognised the primacy of the need for artificial ventilation: “privation of breathing appears to be the first cause of the heart’s motion ceasing; and therefore, most probably, the restoration of breathing is all that is necessary to restore the heart’s motion”. But although he describes both “air being thrown into the lungs”, and “blowing air into the lungs” with bellows, with or without a tube, his proposals do not mention doing that by an EAV mode, either by mouth-to-mouth or by mouth-to-tube (whereas J Fothergill’s “blowing” advice meant precisely that). Perhaps he was influenced by brother William’s antagonistic attitude.\(^\text{13}\)

John Hunter emphasised immediacy: “every moment of which delay [in procuring ‘assistance’] renders recovery more precarious”; and insisted on gradual warming; perhaps oxygen too (“dephlogisticated air … may prove more efficacious than common air”); and a reversed form of the Sellick manoeuvre, which Monro Secundus had already described.\(^\text{46}\)
ship, which is intriguing.\textsuperscript{31} John Hunter condemned blood letting and stimulants, and avoided tobacco fumigation via the anus. He advised having a resuscitator’s assistant and exhorted accurate keeping of all case records. The Humane Society officially endorsed his recommendations (although not until 1782) and adopted his bellows.\textsuperscript{1,13}

Alternatives to mouth-to-mouth resuscitation

Aesthetic considerations were often a powerful inhibitor to applying the direct contact necessary for EAV, and variations of technique were devised to overcome objections. “Not relishing its [mouth-to-mouth’s] performance”, John Fothergill developed inflating bellows for a tracheal tube (1774).\textsuperscript{18} Societies in multiple countries were coming to favour the indirect methods of EAV, whenever such were possible.

Possible options were:

- to blow into some kind of tube inserted into the patient’s mouth (Smellie\textsuperscript{19}), nostril (Monro Secundus\textsuperscript{20}), or a tracheal slit directly (Vesalius,\textsuperscript{FN16}11,19 Glover\textsuperscript{21}); or the larynx (Pugh\textsuperscript{22}) or beyond it, into the trachea (Monro Secundus\textsuperscript{23}); or
- to squeeze a set of bellows to inflate the lungs, after either inserting the nozzle directly into the above sites of entry into the patient: the mouth, a nostril, a tracheal slit (eg, John Hunter\textsuperscript{24}); or connecting the nozzle to a tube already inserted into one of the above entry sites.

The mouth-to-mouth mode was still a treatment option for rescuers who were unskilled, failing with, unwilling or unable to try, instrumentation. Adding both oxygen and “electricity” was encouraged where that was feasible.\textsuperscript{44,46} Otherwise, the age-old efforts and archaic practices listed earlier, within the section A comment on mid-18th century resuscitation priorities, were the only means available for lay folk and unskilled doctors.\textsuperscript{7} It is possible that for centuries household bellows may have, on occasion, been thrust into the mouth by lay people in desperate attempts at artificial ventilation, but this does not appear reliably documented.

Arguments against using expired air

After initial enthusiasm for mouth-to-mouth within humane societies, enthusiasm diminished for rescue breathing in spite of the observable successes which were achieved — and documented. Its drawbacks were considered to be:

Perceived inadequacy: This derived from the discoveries in chemistry: i) by Joseph Black of “fixed air” (later called carbon dioxide) in 1754, already mentioned; and ii) by Reverend Joseph Priestley of a new gas (later named “oxygene” by Antoine-L de Lavoisier), obtained first from saltpetre in 1771, then as “dephlogisticated air” from red mercuric oxide on 1 August 1774. (Carl Scheele, discovering “fire air”, or oxygen, independently in 1772 did not publish that for 5 years.) Once Priestley’s experiments with mice identified this oxygen as the Vital Element to be breathed in, some argued that expired air had already had that principle taken out of it by respiration. As late as 1817, the Royal Humane Society still believed that its removal left expired air which “is not pure air but chiefly carbolic similar to what arises from burning charcoal, it is more likely to destroy rather than to promote the action of the lungs and so should be avoided”.\textsuperscript{\textsuperscript{25}} So K Garth Huston can state that with the discovery of oxygen, “In addition to the indelicacy of the [mouth-to-mouth] method, it was felt more oxygen could be given to the patient with a bellows than from respired air”.\textsuperscript{\textsuperscript{26}} So expired air was rejected.\textsuperscript{17} (And incidentally, Huston believed that the discrediting of rectal tobacco decreased confidence in other techniques which were beneficial.\textsuperscript{\textsuperscript{27}})

Thus mouth-to-mouth came to be considered outmoded,\textsuperscript{23} and was replaced by artificial ventilation methods with bellows, and later pistons, among which Nooth’s pump, a “glass syringe”\textsuperscript{53} allowing inflation by graduated volumes,\textsuperscript{18} became popular.

Experts such as John Hunter,\textsuperscript{49} and later Anthony Fothergill,\textsuperscript{44} Charles Kite,\textsuperscript{44} Edmund Goodwyn and others, were suggesting that any oxygen available be used for resuscitation.

Aesthetic undesirability: A typical further expression of dislike for EAV came from Benjamin Waterhouse’s declaration\textsuperscript{2} to the Massachusetts Humane Society, as its 1790 annual dinner’s invited speaker: “To blow one’s own breath into the lungs of another is an absurd and pernicious practice”.

Fear of transmission of infection: Infections were the most common cause of death at that time, and the considerable likelihood of contagion was a grim prospect. Many descriptive slurs on mouth-to-mouth can be found in the literature from this time. Carolyn Williams cited\textsuperscript{5} — as
“a sure sign that an institution [here, mouth-to-mouth inflation] has arrived on the public stage” — references to it on the stage: for instance, a character in Richard Cumberland's 1785 comedy, *The natural son*, complains he has “contracted a consumption” from it.

Further concerning EAV and humane societies

Progressive disenchantment with EAV in the UK led to the Humane Society (1782) formally recommending the use of bellows, inserted into the mouth or a nostril, for artificial ventilation.1 Cary reports,17 with no further detail, that “Dr [Alexander] Johnson’s account of the Amsterdam Society published about 1785, registers an objection against the method” [of mouth-to-mouth]. Hawes, on his pocket-card of c. 1786,2 did not advocate mouth-to-mouth but EAV: “Apply the pipe of a common sized bellows up the nostril, and blow with some force, closing the other nostril and mouth...” with an assistant following on to express an expiration.3 (But see below for Hawes’s 1786 contrary advice to Charles Kite.)

In 1788, the Massachusetts Humane Society recorded with one short case report: breathe “forcibly into the mouth, and continue this act until he should recover or become cold”.18n74 And possibly from 1791, the Philadelphia Humane Society's directions40 for preventing sudden death were “Close the mouth and one nostril completely. Blow air through the other into the lungs. If bellows cannot be had, air may be blown into the lungs through the open nostril from the mouth of one of the bystanders”.

1787: Charles Kite (1768–1811)

Young surgeon Charles Kite brought significant progress to the understanding of ventilatory and circulatory aspects of resuscitation, especially for rescues from drowning, with which he had become seriously involved at the embarkation port of Gravesend. His 1786 valved set of inflating/exhausting bellows,13 apparently of c. 500mL capacity, was adopted by the Royal Humane Society, while from his own extensive experience, his 1787 *Essay on the recovery of the apparently dead* (dead, principally from drowning) distilled into 274 (+6) pages his conclusions on the essential needs, priorities and techniques in resuscitation. It won him the Royal Humane Society silverFN18 medal a year later, at age 20.

In Kite’s analysis, sudden apparent death or “suspended animation” — whether from drowning, hanging, noxious vapours, syncope or lightning-strike (and also for asphyxia in unborn children surviving the death of the mother) — came from “apoplexy”, a “compreffion or over-fullnefs of the veffels of the brain”, or sometimes from “suffocation about the heart and lungs”. As Kite understood it, “artificial respiration will in general anfwer the purpose of removing the over-diſtenfion of the venous ſystem, conſequently the compreffion of the brain”, as the aim of promoting “expansion and contraction of the lungs [was] to force the blood from the right to the left ventricle of the heart”. Besides being unequivocal in advocating the central role of artificial ventilation, he emphasised immediate intervention. Echoing John Hunter’s 1776 advice,49 he declared, “… we cannot heſitate one moment in pronouncing the reſtoring the action of the lungs to be of the very firſt importance in all our attempts to recover the apparently dead”.

When advising EAV by mouth-to-mouth, Kite quoted the Royal Humane Society’s advice for an assistant to “blow into the mouth through a coarfe cloth” (although note, the society had already recommended bellows instead in 17821) — but only as an emergency, not as a continuing method. (“The difficulty of getting people to continue the … so extremely disagreeable and troublesome … operaſion … will be easily conceived.”) Alternative advice was for a wooden nose-pipe to be attached, either for EAV or for valved bellows. Kite suggested inflating the lungs with the nozzle of the bellows in the mouth or, better, in a nostril; but if there was an “impediment to the proper and effective inhalation of the lungs then try the tube bent like a male cathether”. This was contained in his doctor’s “respiratory” pocket-kit of resuscitation equipment, including a metal translaryngeal tube and fold-up bellows for inflating, which he and John Savigny had devised. They also produced an integrated system of bellows, tubes and exact connections, for inflating the lungs.

For ideal artificial ventilation, Kite recommended a “medical director” (for closing the mouth, exerting pressure on the front of the neck to “prevent the air paffing into the ſtomach instead of entering the lungs”, and providing expiratory chest compressions), and “a proper perſon” as his assistant, at the victim’s head (for supplying artificial ventilation by mouth or by bellows to a tube, intra-orally or intra-tracheally). A “third perſon must preſs the belly up fo as to force the air out”. “Tracheotomy is our laſt expedient.”

Kite also advocated the use of oxygen, described various stimulants, and endorsed electric shocks, but still accepted

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FN18. Only the silver for this magnificent study? Yes, the Royal Humane Society awarded the 1788 gold medal to Edmund Goodwyn for his entry, The connexion of life with respiration. The Medical Society of London assessed eight dissertations on behalf of the Royal Humane Society.44[pi]
“occasional” bleeding from the jugular, though at times appearing ambivalent about its value. His essay’s innovative features are admirably described: clearly argued principles of resuscitation, Royal Humane Society data and valuable analyses of case details, data-gathering charts for future studies, plus diagrams of their inventive equipment. Kite quotes his own 1785 “electric shocks” case, as well as the famous case history of the 1774 resuscitation successful only after shocks, and offers the diagram of his own simple apparatus for shocking.

Charles Kite’s time was one when initial lay efforts were, at best, only warming and heavy stimulation, and still perhaps the antiquated practice of rectal fumigation with tobacco smoke. Despite the earlier enthusiasm of John Fothergill and then the Humane Society, how much mouth-to-mouth EAV, lay or medical, was performed in England outside obstetrics does not appear known. It was only because of clear-sighted early pioneers such as John Hunter and Charles Kite that many time-honoured but futile rituals were dropped. It also became obvious that doctors, providing effective artificial ventilation with bellows, or possibly able to insert a translaryngeal tube and attach bellows to it, were often reaching the scene too late to help lay rescuers. Kite and the Royal Humane Society established strategically located Rescue Stations at waterside posts, holding practical aids for artificial ventilation (metal translaryngeal tubes and bellows), and Receiving Houses, foreshadowed in Kite’s essay, in London around the Serpentine and for 12 miles along the banks of the Thames from Westminster. Some of these were manned, even medically.

Others, such as James Curry in 1791, and the Royal Humane Society itself in 1806, developed resuscitation kits with silver airway tubes and bellows, resulting in numerous life-saving interventions being undertaken, especially for the apparently drowned.

**1796: John Daniel Herholdt (1764–1836) and Carl Gottlieb Rafn (1769–1808)**

Herholdt and Rafn’s *Life-saving measures for drowning persons*, a truly remarkable booklet of 112 pages in Danish, reviewed and summarised those transactions of humane societies concerned with the recent history of resuscitation of the drowned published to the time of writing (1796), together with the knowledge, methods and available means, especially equipment, then being employed in rescues in Europe.

For Denmark itself, the authors describe Professor P G Hensler’s treatise on life-saving measures, printed 1770, as inspiring the Danish Government to command a copy go to each Parson, parish Executive Officer, County Lord Lieutenant and Bailiff in the Counties”, etc, (and to their successors), as well as in the Kingdom of Norway. (The authors’ prime dedication of their book was to Hensler.) Despite all that, plus the April 1772 Ordinance from the King endorsing Hensler, and the May Proclamation from the Danish Chancellery about preventing and saving from drowning, Herholdt and Rafn deplore the wide lack of public “Life-saving Measures” in Denmark. They stated that 45 drownings might occur annually in Copenhagen alone, of which they estimated that, with proper measures, perhaps two-thirds could be saved. This book indicated their disgust at the failure of any authority in Denmark to have established any proper rescue organisation (and perhaps their protests led to better organisation?).

The authors declare (page 41), “It is clear that the entire Plan of Treatment must aim at (1) removing all Hindrances to the Vital Functions [presumably, as they mention on page 42, “all the Froth, Slime and Mud”: starting again, especially, (2) the Respiration and (3) the Circulation of the Blood; and (4) restoring the suppressed Energy of the Nerves”. Then they clearly reinforce previous exhortations from John Hunter and Charles Kite: “Above all, the Arrested Respiration should be started again … as soon as possible”.

An English translation of the book was achieved in 1960, under Editor-in-chief Henning Poulsen, for a handout celebrating the 10th anniversary of the Scandinavian Society of Anaesthesiologists. He states in his foreword, “The mouth-to-mouth method is carefully and vivably [sic] described on pages 59–62 in a section entitled: … Insufflation of Air into the Lungs” [in fact, these translated words are on page 45 of the English version; “pages 59–62” refers to the Danish version] … and it emphasises the advantages [does it really?] and disadvantages of this method”. Certainly, Herholdt and Rafn establish the physiological soundness of mouth-to-mouth for EAV, but to this reader their endorsement of the method seems lacking in enthusiasm. After description of a sternal compression technique (producing an expiratory assist, which would be followed by elastic recoil action of the rib cartilages to spontaneously draw in an inflation with “Pure Atmosphere”), which has only a “weak” effect but is more efficacious in children, the authors then succinctly describe a mouth-to-mouth technique, one with an expiratory assist manoeuvre also. Criticism of mouth-to-mouth follows on page 46, as a system hardly to be recommended:

*But as the Insufflation of Air by mouth is a very Toilsome and Loathesome Act, and since accordingly an otherwise laudable delicacy of feeling usually prohibits both the*
Physician and other People of Propriety from using this method, especially in Adults or People of advanced years who have been drowned, it is of little use [my emphasis]. So far we have heard of only a few examples where well-known men have overcome the unpleasant feeling associated with this act and in Honourable Enthusiasm used their own mouths for that purpose ….

This method is admittedly less disgusting when one blows through a Pipe-stem or another small Tube which is inserted into the Nostrils or the Mouth.

And: It is a far better means to bring Pure Atmosphere which has not been fouled by other people’s breathing into the lungs of the Drowned Person.

Artificial ventilation by other than mouth-to-mouth is then described in detail: by “ordinary bellows”, nozzles, and tubes. The authors debunked “blood letting”.

Mouth-to-mouth EAV towards the end of the 18th century in Britain

By his experiments from about 1782, but published 4 and 6 years later, Edmund Goodwyn\(^{19}\) (1756–1829) had increased the chances of mouth-to-mouth success in EAV, by discovering that the tongue could fall back and obstruct the airway in an unconscious victim lying supine. He also advocated supplying oxygen (as did Anthony Fothergill\(^{14}\)), there were multiple differences of opinion among the resuscitation promoters Goodwyn, Kite, Fothergill, Edward Coleman and others). But mouth-to-mouth was declining once the Humane Society formally recommended the use of bellows (1782) “as the best means of carrying on artificial respiration” — although Sir Arthur Keith stated in his review of the history of the Royal Humane Society for his Hunterian Lectures of 1909\(^{14}\) that, in many of the cases recorded then, no mention is made by the rescuer of having used bellows.

Writers on resuscitation history usually describe a decline in applying mouth-to-mouth for EAV by the end of the 18th century. With the system of careful documentation of rescue attempts filed in the Royal Humane Society records, one might hope it was possible to ascertain the actual degree of its employment in London and its surrounds. Keith’s review\(^{14}\) was possibly the first detailed study to be carried out systematically since Charles Kite studied time lengths of immersion in 1787.\(^{44}\) Perhaps P J Bishop’s 1974 study for the Royal Humane Society’s 200th anniversary Short history\(^{1}\) is the next published source available.

Keith’s table for succeeding periods of the “chief means employed” lists for the years:

- 1774–1793, “Warmth, Fumigation, Inflation”, with 43.7% unsuccessful. For this period, Sir Arthur says “… artificial respiration, if applied at all, took the form of mouth-to-mouth inflation”\(^{19}\)
- 1796–1811, “Warmth, Inflation(bellows)”, with 54.8% unsuccessful.

To judge from how Sir Arthur expresses it, “bellows” obviously qualifies “inflation”, which is reinforced by the juxtaposition of the two words in his text. That would seem to indicate there was no mouth-to-mouth at all in the Royal Humane Society records for 1796–1811. But it is surely surprising to be asked to accept that it was not employed in a single one of 2470 successful cases? Sir Arthur points out that using bellows had the least success of any “period” he lists between 1774 and 1907.

Obstetricians continued intervening for the apnoeic newborn, for whom James Elam (1954) could still assert that EAV “continued to be used without the official endorsement of medical organisations” after the Royal Humane Society abandoned its practice.\(^{55}\)

Conclusion

Mouth-to-mouth rescue breathing was (?re-)introduced to adult resuscitation in the 18th century after apparently minimal employment, apart from that by midwives for neonates. In a developing Age of Enlightenment, humane societies, the first one founded in Amsterdam (1767), initially adopted it for respiratory resuscitation. Arthur Keith showed mouth-to-mouth for EAV still flourishing in Britain until 1793, but official endorsement had been lost there for a decade. By the end of the century, enthusiasm for it was well past its peak, principally for aesthetic reasons, and lung inflation manually with designed bellows was favoured. Translaryngeal tubes, usually metal, were developed once Monro Secundus described his tactile intubating technique for doctors. Absence of special equipment on-site or medical help readily to hand precluded such use, and a victim’s life might then depend on whether a lay attendant was prepared to apply rescue breathing by mouth to mouth. However, the turn of the century still featured its practice in midwifery, and this theme and others will be pursued in Part 3.

Diversions, as postscripts

1. Intensivists may be interested to note that a non-resuscitative, intensive-care-type intervention was demonstrated before

\(^{19}\) FN19. Whereas, for the year 1773 in France, Sir Arthur says that only 11% were unsuccessful by “inflation” alone!
the 18th century ended. Versatile surgeon Pierre-J Desault is credited with maintaining a nasotracheal catheter in place for glottic swelling for a day and a half. Although this has been described as occurring in 1802, or in the early 19th century, it had to be before the time of his death in 1795. I have failed to locate a full case account in English. Desault treated “several cases of oedema of the glottis by successful blind endotracheal intubation”.

2. I find remarkable the number of Scotsmen to the forefront in resuscitation during this period (several of them were Quaker physicians). The list appears to include: William Tossach, William Buchan, William and John Hunter, Alexander Monro Secundus, William Cullen, Lord Cathcart, Edmund Goodwyn, Edward Coleman and David Ramsay. This feature must also reflect the excellence of Edinburgh’s 18th century medical school, which was also attended by resuscitation supporters, the Northerners, John and Anthony Fothergill, and Irishman, Oliver Goldsmith.

3. Kite’s massive Essay seems to me a staggering achievement, with all the experience and judgement needed to write it — yet he did it as a 19-year-old.

Acknowledgements

I wish to acknowledge the immense help received from many people enabling the completion of this article: my wife, Elizabeth; librarians at the Philson, ANZCA, Otago Medical School, E & M Davis, Wellcome, British, and Auckland City Libraries (however would we manage without librarians?); Barry Baker; Tony Newson; Douglass Taylor; Marianne Forbes; Ross MacFarlane (of RSL); Richard German; David Wilkinson; Anne Crowther; C-J Simmons; and an ever-tolerant editor, Vernon van Heerden, and his staff.

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