History of medicine

History of mouth-to-mouth rescue breathing. Part 1

Based on a talk delivered to the Annual Scientific Meeting of the Australian and New Zealand College of Anaesthetists, at Auckland, May 2005.

AB Baker's description, to the Second International Symposium on the History of Anaesthesia, London 1987, of a famous and medically historical event as "The first undoubted therapeutic expired air resuscitation to be reported", provides this brief account with a convenient introductory topic. It happened on 3 December 1732 at Alloa, Scotland, where local surgeon William Tossach successfully employed expired air ventilation (hereinafter referred to as EAV) to resuscitate James Blair, a coal-pit miner "in all appearance dead". Having been brought up 34 fathoms "to the Mouth of the Pit, which was between half an Hour and three Quarters after he had been left in the Bottom of it." Blair was apparently pulseless and lifeless. Tossach's documentation of what followed appears to be the first medical recording of EAV.² Some of the telling lines in an extract from his own account, not published until 1744, are underlined:

"The colour was natural, except where it was covered with Coal-dust; his eyes were staring open, and his Mouth was gaping wide; his Skin was cold; there was not the least pulse in either Heart or Arteries, and not the least Breathing could be observed; So that he was in all appearance dead. I applied my Mouth close to his, and blowed my breathe as strong as I could; but having neglected to stop his Nostrils all the Air came out at them; Wherefore taking hold of them with one hand and holding my other on his Breast at the left Pap I blew again my breath as strong as I could, raising his Chest fully with it; and immediately I felt six or seven very quick Beats of the heart; his Thorax continued to play, and the Pulse was felt soon after in the Arteries.

I then opened a Vein in his Arm; which, after giving a small Jet, sent out the Blood in Drops only, for a Quarter of an Hour And then he bled freely. Tho' the lungs continued to play, after I had first set them in Motion; yet for more than half an Hour, it was only as a pair of bellows would have done, that is, he did not so much as grone, and his Eyes and Mouth remained both open. After about an Hour he began to yawn, and to move his Eyelids, Hands, and Feet. In an Hour more he came pretty well to his Senses, and could take Drink;

but knew nothing at all that had happened after his lying down at the Foot of the Ladders, till his waking"

A founding moment?

Tossach thus documented the resuscitation by EAV of someone – in the phrase of the time – "apparently recently dead". After a false start, once an effective mouth-to-mouth breath had produced the initial successful chest expansion, the "dead" victim's heartbeat became detectable. And though description is unfortunately a little unclear, I do take it that "his Thorax continued to play" [and later, "the lungs continued to play, after I had first set them in Motion"] means spontaneous breathing was established by that single inflation. So if Tossach needed to supply only one good breath to restart spontaneous breathing in his patient, then for circumstances such as he described, one could think that was an immediate response; could he really have been "dead enough" for cardiopulmonary function to revive so instantly? Nonetheless, all credit is due to William Tossach. By 12 years later when he published his own account, apparently knowledge of his success was already widespread in Britain and Europe. Labelling it here as a "founding moment" need not deny, nor devalue, any of his predecessors.

Antecedents

On looking back for earlier accounts of EAV, the waters prove murkier. Apart from repeated mention of the Hebrew prophets Elisha and Elijah, what the medical literature contains is quite sparse. The need to tread carefully soon becomes obvious, because apparent misinterpretations abound. Direct mouth-to-mouth EAV has long been known as "The Biblical Method," and on searching the recent literature for clues as to its genesis and also its dating, two seemingly ideal quotes emerged:

- 1. A general statement was available from S N Kothare and N Khumar's chapter "Medical Emergencies," in Kothare and Sanjay Pai's 1996-7 "Introduction to the History of Medicine": ³
 - "The origin of the resuscitative process which uses expired air for ventilation, can be traced to the Hebrew midwives who resuscitated newborn infants (1300 B. C.) with this technique". Attempts to trace the chapter's authors could not locate them, and editor Pai [writing S N Kothare's obituary at the time he was approached] was unable to provide the authority for a dating of 1300 BC.
- 2. A more specific statement was obtained from the revered Peter Safar's classic account, "History of Cardiopulmonary-Cerebral Resuscitation" his chapter in W Kaye and N G Bircher's "Cardiopulmonary Resuscitation":

"...in Exodus (1: 15-17): the Hebrew midwife Puah ... 'breathed into the baby's mouth to induce the baby to cry'".

However, when those verses are checked in Exodus they will be seen to be solely about the historical midwife Puah protecting Hebrew newborn males from the death decreed for them by the Pharaoh. The verses are not at all about her applying EAV for "Newborn resuscitation", as Safar claims. A case of Homer nodding? (in the 1791 words of Martin Routh: always verify your references). But in the time since Safar wrote that sentence, other authors have now quoted him for those verses directly. His specific line, 'breathed into the baby's mouth to induce the baby to cry', has not as yet been located elsewhere.

Peter Safar⁴ also supplies a relatively precise date of "about 896 B.C." for the Hebrew prophet Elisha reviving the Shunammite child after his "death" many hours earlier. That episode will be discussed later.

Further about the 'Biblical Method'

The first of three references, ⁶⁻⁸ found after further searching "Respiratory resuscitation in ancient Hebrew sources" looked the best to provide an ideal resource.

In writing from Jerusalem, Drs Z. Rosen and J T Davidson,⁶ describe the Biblical Method (of EAV) as "deeply rooted in Hebrew tradition". They state: "There is an old tradition that the Hebrew midwives, during the Egyptian captivity period (about 1300 B.C.) utilised the expired-air method for resuscitation of the newborn." Possibly then, as Prof. Pai now agrees, their paper is the origin of Kothare's dating of c.1300 B.C. But the authority Rosen and Davidson provide for that dating is no further developed beyond one of "Long standing tradition". Note the Rabbi consultant in Judaic Studies whom Rosen and Davidson consulted declared that their "review of the direct references to the medical practice of resuscitation is both accurate and comprehensive for the period they study".

More from Rosen & Davidson⁶ on Hebrew newborn

The authors provide further informative semi-Biblical comment on EAV.

1. Commentary from the Midrash (see endnote*) Rabbah of the 11th and 12th Centuries: Rosen and Davidson, offering better than a reference depending on "by tradition", perhaps reinforce their authority by quoting this Midrash, to the effect that the Hebrew midwife, Puah [she of the generation immediately prior to Moses, and so famous in Exodus 1: 15-20] "used to revive (mepiah) the infant (with her respiration) when people said it was dead". The exact source of this Midrash is Midrash Rabah (Vilna edition), Shemot 1;13 – it mentions mepiah,

but the meaning of this is somewhat unclear and only one authority, the Matnot Kehunah, (from Medieval times) renders the meaning as being "blew into their bodies".

So late documentation – of a kind – does exist, but its origin still lies in tradition.

2. Commentary from the Babylonian Talmud: Shabbat 128b, dated 200 B.C. - 500 A.D.:

Rosen and Davidson quote the Talmud as here discussing "A rabbinical dispute ...(over)... the problem of 'assisting in breathing in delivery'. The following advice is tendered: 'The newborn is held so that it should not fall on the earth and one blows into its nostrils'." This action has been interpreted by many as advocating EAV. But when one follows Routh's 1791 advice⁵ - especially after the lesson from Safar's earlier misquote⁴ of Exodus - and consults the Babylonian Talmud Shabbat 128b itself, one translation from the Internet has it that: GEMARA (see endnote*).

"How may we assist? Rab Judah said: The newborn [calf, lamb, etc.] is held so that it should not fall on the earth. R. Nahman said: The flesh is compressed in order that the young should come out. It was taught in accordance with Rab Judah. How do we assist? We may hold the young so that it should not fall on the ground, blow into its nostrils, 13 and put the teat into its mouth that it should suck. 13 To clear them of their mucus, etc."

- The newborn which Rosen and Davidson referred to
 is a *calf or lamb* [or an "etc"] so the quotation
 appears to apply only to animals, not humans.
 Therefore one can question whether, as Rosen and
 Davidson imply, "the new born" does actually
 include humans though a herdsman or midwife
 could well be likely to make the link.
- 2). After the word "nostrils" there is a superscript [numbered 13] which has the words "To clear them of their mucus, etc". This superscript was either unavailable to authors Rosen and Davidson or they ignored it. Its phrasing would seem to indicate that the assistance recommended to be given, refers to no more than toiletting the upper airway, and not as they imply, to EAV. The superscript is a comment by the foremost commentator on the Talmud, called Rashi, written some 700 years after the Talmud – he is extremely well-known and should have been available to the authors – so it seems they must have ignored him. John Paraskos's article, "Biblical accounts of resuscitation," gives the paper by Rosen and Davidson⁶ as his only source of "evidence [which] suggests that assisted ventilation with expired air may have been carried out by Jews in Talmudic times".

Incidentally, there were no commenting or dissenting Letters to the Editor in the journal *Anesthesia and Analgesia*, after it published Rosen and Davidson's paper.

Elisha and the Shunammite child

The Old Testament's verses concerning Elisha and the Shunammite child (*II Kings* 4: 32-35), a son of special conception, are almost universally quoted by many medical writers as the example, *par excellence*, of EAV by the so-called Biblical method. ("And he went up and lay upon the child, and put his mouth upon his mouth, and his eyes upon his eyes, and his hands upon his hands: and he stretched himself upon the child; and the flesh of the child waxed warm")¹⁰

The verses are characteristically dated for c.800 B.C., when the Hebrews were settled in the Promised Land – but also note Safar's older dating of c.896 B.C.,⁴ already mentioned. Rosen and Davidson's paper⁶ has fascinating discussion of this event.

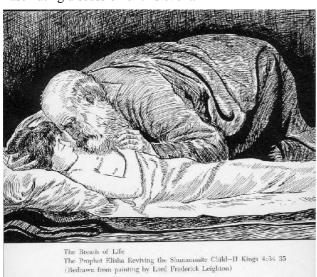


Figure 1. A redrawing of Lord Leighton's painting of Elisha and child."The Breath of Life. The Prophet Elisha Reviving the Shunammite Child -II Kings 4:34-35" (Redrawn from painting by Lord Frederick Leighton. With permission – see Acknowledgements)

Despite the commonly held belief that this verse is describing EAV to produce resuscitation of the Shunammite child, the actual words, as provided to us in the King James translation into English, do not indicate that Elisha breathed into the child's lungs to restore life by mouth-to-mouth rescue breathing. This writer takes it that the Bible is describing Elisha as performing a miracle, as at other sites in its text. Or, perhaps the awakening was natural recovery from a comatose state, one that could have been due to sunstroke, as Safar, for instance, suggests; or to a subarachnoid leak/bleed. So on these grounds this writer rejects that Elisha's "resuscitation" is an example of

EAV – as did Barry Baker¹, Joseph Redding¹¹ and others [e.g., see the Addendum]. Rosen & Davidson's Christian commentator is also rather wary in the interesting arguments which he offers.⁴ A link to EAV of the earlier biblical "resuscitation" by Elisha's teacher Elijah [*I Kings* 17: 17-22],¹² as Fred Rosner claims,¹³ among many, appears even more tenuous on such grounds – if not on miraculous ones.

The central mystery

Yet a mystery remains: in medical writings why should these biblical accounts be so firmly embedded as examples of EAV? It could be natural enough, though unscientific, to try to equate 20th Century understandings with recorded descriptions of events back in antiquity. Perhaps an answer lies in the careful analysis by John Paraskos. He points out that there are translations of the Hebrew Scriptures – but not in the Massoretic Text (MT) (see **endnote) - which do have Elisha breathing *into* the child, after all: namely,

- i) in the Septuagint (LXX), that translation of the Hebrew into Greek; and now also
- ii) in the New English Translation (NET) of the *Holy Bible*. But Paraskos describes the translation within the NET as reflecting the LXX text (see **endnote).

Even if the two texts, LXX and NET, are correct in this respect, the recovery of the child occurred after he had been "dead" for the many hours that the described events would have taken. Thus: after the boy had been brought in from the fields, where he had complained "my head, my head," he sat awhile on his mother's knee, then died at noon. His mother went to fetch Elisha, travelling the 40 kilometres from Shunem to Mt Carmel by donkey; then, together, they walked back to find the child apparently still "dead and laid upon his bed". If the child was actually dead, then he had been so for far too long to be resuscitated by EAV. But if Elisha did in fact breathe into his lungs to expand them, and if the dead boy wakened thereupon, then resuscitation by EAV could not have been effective after such a long time of "being dead". So this recovery must still have to be regarded as "a miraculous event". But if he had not been dead, then recovery was a natural event (possibly helped by the warmth Elisha applied).

So despite such translations as can be found in the Septuagint and the New English Translation, this writer continues in his rejection of this event's being described as an early administration of EAV, for the reason John Paraskos gives, outlined in the endnote.** But for those to whom this subject is of interest I strongly recommend reading the details in his elegant article.

It is the opinion of this writer that possibly only 2 of the 4 sources discussed [see table1] warrant a tick for EAV. Yet multiple histories of cardiopulmonary resuscitation now refer to those of them which are dubious; and since their number included Peter Safar's account the legends have been perpetuated.

So, it is offered that while no real hard evidence is actually documented, there is a tradition that Hebrew midwives, esp. the historical woman Puah, did apply EAV for the newborn. Otherwise, scepticism must largely reign. But one does also wonder what, if anything, other cultures provided for neonatal apnoea, since the next written mention in the West is not found near-Renaissance times. "Mouth to mouth resuscitation was the secret of midwives and passed to medicine, quite late," states Steven Harris. 15 Was the secret totally confined to midwives, and was it not held anywhere outside the Hebrew experience? expression, The Midwives' Secret, has been used by many authors because, pre-Renaissance, there is so little generally known about the actions of midwives for their apnoeic [or stillborn] patients.

Table 1. A summary of ancient documentation of expired air ventilation

✓ c.1300 BC	Tradition – Hebrew midwives, and Puah (of <i>Exodus</i> 1)
× c.0800 BC	II Kings 4: Elisha (spurious for EAV)
✓ (?) C11 to C12 AD	Midrash Rabbah – Puah (ex mepiah = revive) used EAV
× 200 BC to 500 AD	Babylonian Talmud Shabbath 128b - spurious re: human newborn

Before the 18th Century's Age of Enlightenment

After Puah, an era lasting more than 21/2 millenia passed before much specific mention about adult resuscitation appeared. There were occasional reports though of tracheostomy: one in antiquity reputedly made by Alexander the Great with his dagger point. 16 Throughout this long interim it does not seem to be known whether EAV was employed for resuscitation, other than with neonates, if at all. But presumably, it could well have been a practice undertaken in some places. T. Forcht Dagi¹⁷ does not further amplify concerning ventilatory methods his assertion - not a unique one - that resuscitation had been practised long before records of sporadic attempts appeared in the 16th Century. So prior to the time of William Tossach's documentation, just when did EAV first become employed for adults - if it ever had been - for resuscitation, as well as being applied for neonates?

Multiple inhibitions to resuscitative attempts (table 2 below) had been long prominent for a combination of reasons. 17,18 Among these were: any attempt to revive the dead being the frustrating of God's will; the suffering of relatives being redemptive; the lack of physiological knowledge, due to dissection of bodies forbidden for so long; etc. In the West resuscitation had for the most part been largely abandoned from times after Hippocrates for almost two millenia. Doctors, hardly bothering themselves with concerns resuscitation anyway, considered the EAV practice of midwives as "vulgar". Still, it has been said that by the early 18th Century the knowledge of EAV had been long held, principally by midwives for the newborn, and watermen attempting resuscitation of the drowned, and by colliers, before doctors really became involved.¹

Table 2. Inhibitions to development of resuscitation skills before the 17th Century ^{17,18}

Poor knowledge of anatomy and thereby, function

Dissections forbidden in many eras during >1500 years

Greeks, Romans, Dark Ages, Medieval Europe

Certain religious ideas

Concern for the afterlife was foremost, so priority for soul over body

Sudden death accepted as God's will, so resuscitation was protesting against God's will

Intervention was considered "an act of unchristianness and lawlessness". Uncertainty about death itself 17,19

If he/she was apparently dead, was he/she actually so?

Doubt about earliest signs of death

What had caused it (accident, suicide, murder or execution?)

Fears of premature interment¹⁷

Reluctance to touch a dead body

Fears of contagion

Fears of reprisals (religious or judicial) - some countries prohibited touching a body until it was seen by a court officer

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Arthur Keith's 1909 assertion²⁰ that "The laity had practised methods of resuscitation since time immemorial" is too imprecise to tell us which years or eras before Tossach he was referring to.

Some Resuscitation Events Prior to William Tossach's

1. It seems no one provides readily accessible documentation of EAV until Paolo Bagellardo's 1472 book of paediatrics, which was written in an age when doctors kept themselves remote from childbirth as well as resuscitation. His book is said to be based largely on the works of the two great Middle Eastern physicians Rhazes, c.850-c.923 A.D. (authors disagree), and Ibn-Sina (or Avicenna), 980-1037 A.D. [both of whom were translators and promoters of Galen]. But they are not regarded as advocates of EAV.

Under "Opusculum Recens Natum de Morbis Puerorum" Bagellardo advises Italian midwives to inflate the apnoeic newborn's lungs with air by mouth: "If she find it [the newborn] warm, not black, she should blow into its mouth, if it has no respiration" otherwise that was to be done per rectum – but how, one wonders?. (Quoted by AB Baker, 1971²¹ and 1989¹). This makes it appear as if an EAV practice was established at that time, at least in some medieval Italian states, if not earlier. Some of the resuscitations following illustrate the infrequency of EAV practice before Tossach.

- 2. Because of successes already noted to be occurring from combinations of warming, fumigation and vigorous friction, in 1623 Francis Bacon, without mention of EAV, encouraged doctors to be active in rescuing the suddenly dead.²² [This was 93 years or so after Paracelsus is said to have failed to revive a corpse with fireside bellows¹⁷]. For many centuries however, most doctors were disdainful of intervening in such matters.
- 3. The famous 1639 edition of *The Surgion's Mate* by John Woodall (1556-1643), written for other ship's doctors, contained directions for resuscitative apparatus in the form of a rectal tobacco-smoke fumigator²³ (which was not mentioned in the 1617 original edition personal communication, Joan Druett).²⁴ So by Woodall's medical time almost 1½ centuries after Christopher Columbus returned from America this popular method of resuscitation from there was actively practised.
- 4. But certainly there were sporadic instances of resuscitation by non-medical bystanders, e.g., for Anne Green,²⁵ 1650: her family and friends rescued Anne after 30 minutes of judicial hanging. No EAV was given. The methods available were largely

stimulatory, plus warmth, and success was often attributed to divine providence.



Figure 2. Anne Green's execution and recovery (with permission - see Acknowledgements)

- 5. Concerning Giovanni Borelli, (see endnote***) AB Baker 1987¹, quotes JG Gruebel 1775, for an intriguing 1679 story. On 24 November Borelli was called to a primipara who collapsed after recent delivery. But when he got there "A most faithful servant girl during my absence - stretches herself over the purpura, blows her breathe into her mouth which quickly calls her back to life...". Borelli asked the maid wherever did she learn that; and even if she didn't say that everybody knew about it, she indicated she was employing methods used by midwives on "apparently dead babies". She also mentioned her knowledge of its use at Altenburg [in Thuringia]. Borelli at the same time reported rescue breathing applied by a male servant to his master for what was, obviously, a different resuscitation.
- 6. In those times drowning was the commonest accidental cause of sudden death many fewer, even including sailors, could swim than can today and much effort was given to trying to save the near-drowned. In 1714, Georg Detharding in Denmark advised tracheotomy after apparent drowning.²⁶ I cannot locate what he advised for artificial ventilation, it could well have been blowing down a tube then inserted, but generally, the need for breathing support was poorly recognised at that era.
- 7. The 1730 book *The Uncertainty of Death* by **Jacques Winslow** [a Dane] fostered the already prevalent fears of premature burial¹⁷ and thereby encouraged resuscitative attempts to be made. But even before the time of the book's publication there were [according to Steven Harris¹⁵] "the first word-of-mouth reports of adult resuscitations". So what

was the mode of artificial ventilation? Perhaps none specific, but various stimulations externally, frequently rectal insufflation of tobacco smoke, until of William Tossach's news pioneering demonstration of the efficacy of EAV became widely known and was added to the list. It was usually considered that the need to apply warmth and to empty the lungs of water was of more importance than any early need to inflate the lungs with air. Yet Arthur Keith could later claim in his 1909 first Hunterian lecture²⁰ that before 1767, a year we will see later [Part 2] is of significance to this account, EAV "had been practised for time out of mind throughout Europe ... [for] ... restoring the apparently dead or drowned ... yet ... not often employed by the common people prior to the foundation of the Humane Society." It is not clear to which eras he was referring.

Into the Age of Enlightenment

As the early years of the 18th Century advanced, there was gradual appreciation of the value of an individual life and of one's moral obligations to others. ¹⁷ States of "sudden apparent death" were not to be taken necessarily at face-value but had to be regarded in the first instance as "uncertain". ¹⁷ Formal encouragement to attempt resuscitation began to follow from enthusiastic individuals, who included some obstetricians, and organisations (Humane Societies). Decrees (Royal, Governmental, and Civic) were also issued.

These events and the further tale of mouth-to-mouth rescue breathing by expired air ventilation, after Tossach, make another whole story, to follow.

Endnotes

* The Hebrew Scriptures

The Torah ("Law") was handed down in i) the written form, the Pentateuch, the five books of Moses; but also in ii) an oral traditional form, which was very briefly summarised in the 2nd Century A.D. into a written version, the Mishnah. Further commentary on the Mishnah resulted in "The Talmud". The oral Torah was expounded in much more detail in the 5th Century A.D. into the written, edited compilation known as the Babylonian Talmud (to use the Hebrew word for it) or the Gemarah (the Aramaic word for it - though Safar, 1989, does misquote "Gemara" as if it is a person). There is also a Jerusalem Talmud, but the Babylonian Talmud is considered by most to be the more authoritative. During the 2nd Century, rabbinical commentary on Hebrew scriptures, or Midrash, was written down, with many other Midrashic compilations following – right up to the 13th Century (the Midrash Rabba, known as The Great Midrash, was of the 6th Century).

An essential feature is: that for over thousands of years now, teachings and commentaries on the Hebrew Scriptures have been handed down successive generations in both written and oral forms.

** John Paraskos

Paraskos⁹ explained that 70 [?or 72] Hebrew scholars at Alexandria in the Third Century B.C. (? or c.130 B.C.¹⁴) translated the text of the Hebrew Scriptures into Greek to produce the Septuagint; while over the longer span of the 6-10th Centuries A.D., the "traditionalists" produced the Massoretic text. There are some conflicts between these two principal translations (and others) but

Paraskos declares that "In most cases of textual disagreement, there are linguistic and textual grounds for suspecting the Septuagint, rather than the Massoretic Text, of deviating from an 'original'.".

St Jerome's Latin Vulgate is a 4th Century A.D. translation from the Hebrew text, when that "was practically fixed in the form in which we now have it." The 1609 Douai (Catholic) version, translated from the Latin Vulgate, has its rendering of what is verse II Kings 4:32 in the King James translation [which verse the Douai has as <u>IV</u> Kings 4:32] mirrored in that of the King James version. Both refer to Elisha stretching out upon/over the child, not to Elisha breathing into him.

*** Borelli

Despite widespread researching the author has been unable to establish that this person is any other than the famous iatrophysicist Giovanni Alfonso Borelli, 1608-31 Dec.1679. [AB Baker's experience was similar]. In which case, he died 37 days after the event described. Gruebel refers to him as Borellus.

Acknowledgements

The author wishes to express his gratitude to Rabbi E. Lewis of the Beit Midrash of Western Australia for his reviewing and advice concerning the biblical parts of this paper; and to Prof. Elaine Wainwright, Head of the School of Theology, University of Auckland, for her valuable encouragement.

Also, to the YMCA of the USA, for not objecting – "to the extent [they] retain any rights" - to use of the "redrawing" from their Association Press's 1953 book by Prof. Peter Karpovich, Adventures in Artificial Respiration, of Lord Leighton's painting, Elisha reviving the Shunammite Child. And, to The Keeper of Special Collections and Western Manuscripts of the Bodleian Library Oxford, UK, for permission to use a reproduction of the Anne Green 1651 woodcut, Bodleian Library Reference Bliss B 65(2). And also, to the librarians of the Philson Library at the Faculty of Medicine and Health Sciences, University of Auckland, and of the College Library at the Australian and New Zealand College of Anaesthetists, Melbourne, Australia, without all of whose help this paper could never have been written.

Addendum

Since this paper was written the author has stumbled upon more Elisha controversy of 92 years go. A lively correspondence appeared in The Lancet after Prof. Leonard Hill enquired [Lancet of Feb 1, 1913; 1:345] why mouth-to-mouth breathing was not called "Elisha's method of artificial respiration". The two letters reproduced below responded on the topics of Elisha's actions and Elisha's miracle.

THE LANCET Feb. 8, 1913; issue 4667: p413

ARTIFICIAL RESPIRATION

To the Editor of THE LANCET

Sir—If Dr Leonard Hill will read the verse before the one he quotes from 2 Kings iv. he will find that Elisha was alone with the child. The account of the miracle must therefore have come from Elisha, for the child could hardly have described what took place. If Elisha had blown into the child's mouth, surely he would have said so. The account does not say that the

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child began to breathe, but that "the flesh of the child waxed warm". The narrator evidently thought the child was restored by some transference of vital force, and, as he was also the practitioner, I do not see how we can read anything else into the story. I much doubt if artificial respiration is consistent with the views of physiology held by Elisha, and I do not think he would like the practice to be associated with his name.

I am, Sir, yours faithfully, Silverton, Devon, Feb. 4th, 1913. O. CLAYTON-JONES

To the Editor of THE LANCET

Sir,—Dr. Leonard Hill asks in THE LANCETof Feb. 1st, in referring to Elisha raising the Shunammite's son (2 Kings iv. 34), why is not this, the best method of restoring a child, called Elisha's method of artificial respiration? I would suggest in reply that it has not been so called because it has been included among the number of the miracles performed by Elijah. [The author, RVT, wonders whether he meant Elisha here] Verse 32 states: "And when Elisha came into the house, behold, the child was dead and laid upon his bed." This is confirmed by 2 Kings viii. 5, where Gehazi, the servant of Elisha, is relating the miracle to the King, "And it came to pass, as he was telling the king how he had restored a dead body to life," &c. Bible commentators have suggested that Elisha so stretched himself upon the child in order probably to afford a channel for the Divine influence to pass. But to put the consideration of this aside for a moment, it is probable that in any case the "method" should be attributed to Elisha's predecessor, Elijah, for in Kings xvii, 21, Elijah, in raising the son of the widow of Zarephath, "stretched himself upon the child three times, and cried unto the Lord, and said, O Lord, my God, I pray thee, let this child's soul come into him again."

I am, Sir, yours faithfully, Feb. 3rd, 1913. SEARCHER.

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REFERENCES

- Baker AB. Early attempts at expired air respiration, intubation and manual ventilation. In: Atkinson RS, Boulton TB (eds). The History of Anaesthesia. Carnforth, Lancs: The Parthenon Publishing Group, 1989: p372-374. (Note: This book's Chapter 18: The History of Resuscitation and Intensive Care, p343-371, comprising a set of excellent papers, has been drawn on repeatedly by RVT, the author).
- Tossach WA. A man dead in appearance recovered by distending the lungs with air. Med Essays and Obs Soc Edinb 1744; v (part 2): 605-608.

- 3. Kothare SN, Khumar N. Medical emergencies. In: Kothare SN, Pai S (eds): Introduction to the History of Medicine, 1996:p178 (accessed 1July 2005 at: www.histmedindia.org/).
- Safar P. History of cardiopulmonary-cerebral resuscitation. In: Kaye W, Bircher NG (eds). Cardiopulmonary resuscitation. Clin Crit Car Med 1989;16:1-53.
- 5. Annan N. The Dons. London: HarperCollins, 2000: p6.
- Rosen Z, Davidson JT. Respiratory resuscitation in ancient Hebrew sources. Anesth Analg 1972;51:502-505.
- Chameides L. Resuscitation: a historical overview. NRP Instructor Update 1998(Feb):7no.1). [accessed 1July 2005 at
 - www.aap.org/nrp/DOCS/historical overview nrp.doc].
- Thangam S, Weil MH, Rackow EC. Cardiopulmonary resuscitation: A historical review. Acute Care 1986;12: 63-94.
- 9. Holy Bible, King James version, 1611. II Kings 4:32-35.
- Redding J. Historic vignettes concerning resuscitation from drowning. In: Safar P, Elam J (eds). Advances in Cardiopulmonary Resuscitation. New York: Springer-Verlag, 1977:276-80.
- 11. Holy Bible, King James version, 1611. I Kings 17:17-22.
- Rosner F. Artificial respiration in Biblical times. New York J Med 1969: 69:1104-1105.
- Paraskos JA. Biblical accounts of resuscitation. J Hist Med All Sci 1992;47:310-321.
- Nicolson A. Power and Glory: Jacobean England and the Making of the King James Bible. London: HarperCollins 2003: p.82.
- Harris SB. The Society for the recovery of persons apparently dead. The Skeptic 1992; 1(no.2):24-31(p.29).
- Alberti PW. Tracheotomy versus intubation. A 10th century controversy. Ann Otol Rhinol Laryngol 1984;93:333-337.
- Dagi TF. Exhortations to resuscitate in the 18th century: civic duties in poetry and prose. In: Atkinson RS, Boulton TB (eds). The History of Anaesthesia. Carnforth, Lancs: The Parthenon Publishing Group, 1989:359-367.
- Brandt L, El Gindi M, Duda D, Ellmauer S. The development of organized emergency medicine in the 20th century. In: Atkinson RS, Boulton TB (eds). The History of Anaesthesia. Carnforth, Lancs: The Parthenon Publishing Group, 1989:382-385.
- Wilkinson DJ. The development of resuscitation in the United Kingdom. In: Atkinson RS, Boulton TB (eds). The History of Anaesthesia. Carnforth, Lancs: The Parthenon Publishing Group, 1989:348-351.
- Keith A. [First] Hunterian lecture on the mechanism underlying the various methods of artificial respiration practised since the foundation of the Royal Humane Society in 1774. Lancet 1909 (Mar 13);173(issue 4463): 745-749.
- Baker AB. Artificial respiration, the history of an idea. Med Hist 1971(Oct);XV(no.4):336-351.
- Bacon F. The historie of life and death, with observations naturall and experimentall for the

- prolonging of life. London: Printed by I. Okes for H. Mosley 1638. Cited in Dagi TF (17, above), p.364.
- 23. Druett J. Rough Medicine. Surgeons at Sea in the Age of Sail. New York: Routledge, 2000:p.52-6.
- Woodall J. The Surgions Mate. Facsimile of 1617 edition. Bath [UK]: Kingsmead Press, 1978.
- 25. Hughes J Trevor. Miraculous deliverance of Anne Green: an Oxford case of resuscitation in the seventeenth century. Brit Med J 1982;285:1792-1793.
- Brandt L, Duda D, El Gindi M. The first instruments for resuscitation. In: Atkinson RS, Boulton TB (eds). The History of Anaesthesia. Carnforth, Lancs: The Parthenon Publishing Group, 1989: 375-382.