

Milestones in the evolution of obstetric forceps

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My interest in obstetric instruments stems from my time in Liverpool with Sir Norman Jeffcoate. When the Department was moving to the 'New' Medical School in Ashton Street in the late 1950's I was given the task of sorting out the contents of some tea chests containing rusty ironmongery. It turned out that this was Sir Henry Brigg's unique collection of obstetric instruments, gathered together at the beginning of the twentieth century and relegated to the cellars for safety during the second World War. After conservation and refurbishment they had pride of place in the new Departmental museum.



Figure 1: Bas relief purporting to be Roman, 2nd century A.D.

There are many myths and claims surrounding the origins of obstetric forceps as we know them today, as instruments for delivering a live child. For example, wall-carvings in the temple of Kom Ombo (250 B.C.) have been widely cited but are almost certainly instruments for sacrificial rites. Forceps illustrated in old manuscripts which may have been used by obstetricians would at best have been destructive instruments. In Rome in 1937 Baglioni, displayed a bas relief purporting to be from the

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2nd century A.D. and showing the use of forceps of relatively modern design (Figure 1).¹ Illustrations of this have appeared many times in medical history tomes. In fact it was recognised as a hoax and the tablet was destroyed.²

Middle Ages

Throughout the Middle Ages midwifery was primitive and controlled by the church - only the most cloistered celibate was considered pure enough to discuss midwifery. The subject was immersed in folklore and superstition, herbal potions and fumigations. On occasion mechanical assistance was advocated when labour was obstructed, often using instruments for extraction borrowed from the surgeons, especially lithotomists, or even ladles from the kitchen. There was no concern for the baby, who would almost certainly have been dead long before intervention was considered.

Many midwives gave instruction on the management of difficult labour. Few were committed to print but an example is Dame Trot, practicing in Salerno in the 11th century:^{3,4}

When there is a difficult labour with a dead child place the patient in a sheet held at the corners by four strong men, with her head somewhat elevated. Have them shake the sheet vigorously by pulling on the opposite corners, and with God's will she will give birth.

Not an exercise which would be feasible with present junior doctors hours!

However, with the 16th century new ideas began to evolve and this is where the story of the obstetric forceps really begins, with the activities of the Chamberlen family.

16th and 17th centuries and the Chamberlen family

Many British triumphs and inventions have been consequent on our ready acceptance of refugees. The forceps are no exception and the story begins with the refugee Huguenot family fleeing from Catherine de

¹ S. Baglioni, 'Conoscevano gli antichi l'uso del forcipe ostetrico', *Fisiologia e medicina*, 8 (1937), 169-75.

² F. Crainz, 'Einige wenig bekannte italienische Prioritäten in der Geburtshilfe und Gynäkologie', *Zentrallblatt für Gynäkologi*, 65 (1941), 1452-66.

³ Trotula, *De passioibus mulierum curandarum*. See Tuttle, 1976.

⁴ E.F. Tuttle, 'The Trotula and Old Dame Trot: A Note on the Lady of Salerno', *Bull. Hist. Med.*, 50 (1976), 61-72.

Medici after the battle of Jarnac (1569) and her ban on Protestant physicians.

William, the father, plays little part in the story, apart from begetting sons and calling them Peter. The next three generations encompass the mystery. Two of his sons, Peter-the elder and Peter-the younger, both became members of the Barber Surgeons Company and set up their striped poles. They were both fined for non-attendance at lectures and fell foul of the College of Physicians for giving '*Inward Physick*'. Peter the Elder was probably the originator of the forceps at about the end of the 16th Century, with modifications being made by other members of the family.

Peter-the younger had 8 children, including Dr Peter, who qualified in Medicine in the Universities of Oxford, Cambridge, Padua and Heidelberg by the age of 20. Nevertheless it took him seven years to be admitted to the College of Physicians because they disliked his flamboyant dress. His busy fashionable practice and other activities and absences abroad made him less than attentive in his continuing medical education (it was compulsory even then!) and in 1649 he was dismissed from the College of Physicians for non-attendance at lectures. It was for this reason that he moved outside their jurisdiction to Woodham Mortimer Hall near Maldon in Essex (Figure 2), from where he and his son Hugh continued to practice, although they maintained London connections. The Chamberlens travelled to confinements with their secret instruments concealed in a gilded chest which was only opened in the birth chamber after the patient had been blindfolded. The secret was destined to remain obscure for more than a century.

The Chamberlens were innovators, opportunists and entrepreneurs of no mean talent who tried to promote various schemes for the public good, and their own advancement. By present day standards many of their activities, especially the concealment of the forceps design, would be considered unethical but they were in keeping with the mores of the times. Dr Peter, in 1634, proposed a Sisterhood of Midwives of London, antedating the formation of the Central Midwives Board by over 250 years. He would license midwives competence in return for which he would be paid a fee for each delivery and would be called to all difficult cases. There was strong opposition, including petitions to the Archbishop of Canterbury, the Bishop of London and the College of Physicians. In a publication in 1647 Dr Peter hinted at the existence of the instruments in *The voice of Rhama: or the crie of Women and Children* - 'My father, brothers and myself (tho' none else in Europe as I know) have by God's

blessing and our own industry, attained to and long practised a way to deliver women.....⁵

Dr Peter's son, Hugh, went to Paris, where male midwifery was becoming fashionable under the influence of Louis XIV, and tried to sell the secret to the Royal Accoucheur, Clement, for 10,000 crowns. Clement's challenge to him was to deliver a grossly deformed rachitic dwarf who had already been in labour for eight days. After many hours sequestered with the woman Hugh failed and returned to England with the secret still unrevealed, but with a copy of Mauriceau's best selling textbook, which he translated into English to his considerable financial benefit.



Figure 2: Woodham Mortimer Hall, Essex. Inset: The trapdoor in the attic which concealed the instruments.

⁵ P.Chamberlen, *A Voice in Rhama; or the Crie of Women and Children* (London, 1647).

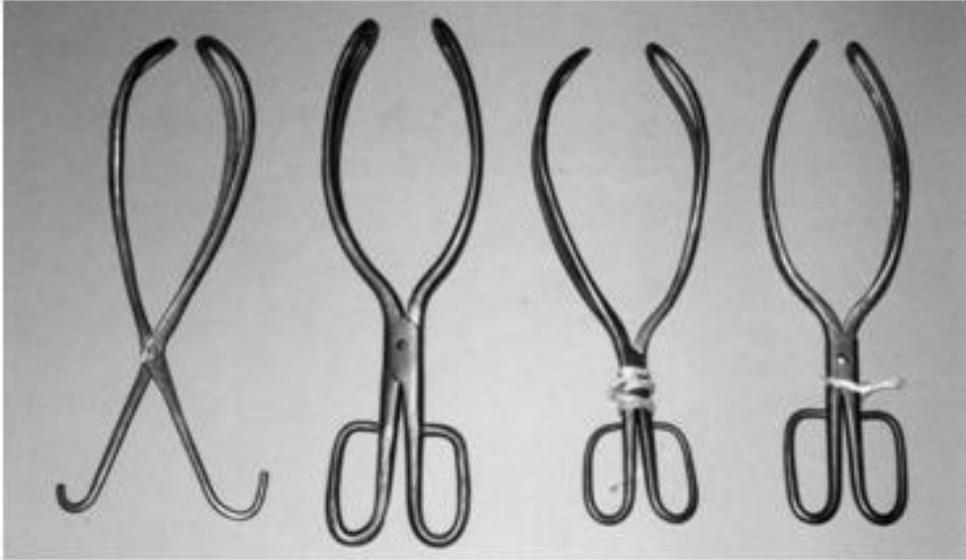


Figure 3: The Chamberlen forceps discovered at Woodham Mortimer, now displayed at the Royal College of Obstetricians and Gynaecologists.

The original forceps (Figure 3), showing progressive development in design, were preserved by Dr Peter's wife in a box of various family keepsakes, including a small testament dated 1645 and a tooth wrapped in a kerchief with the inscription 'my husband's last tooth'. These were secreted under a trap-door in the attic at Woodham Mortimer and were not discovered until 1813. However, the concept seemed to leak out and by the early 18th century the first written records of similar but improved instruments appeared, notably from Chapman and Pugh, who both lived within a few miles of the Chamberlen family home in Essex. The full story is well documented by Radcliffe (1947).⁶

⁶ W. Radcliffe, *The Secret Instrument* (London, Heinemann, 1947). (Reprint with *Milestones in Midwifery* (Bristol: Wright, 1967). San Francisco: Norman Publishing, 1989).



Figure 4: Palfyn's *mains de fer*. He designed several versions, of which three are shown (Science Museum, London).

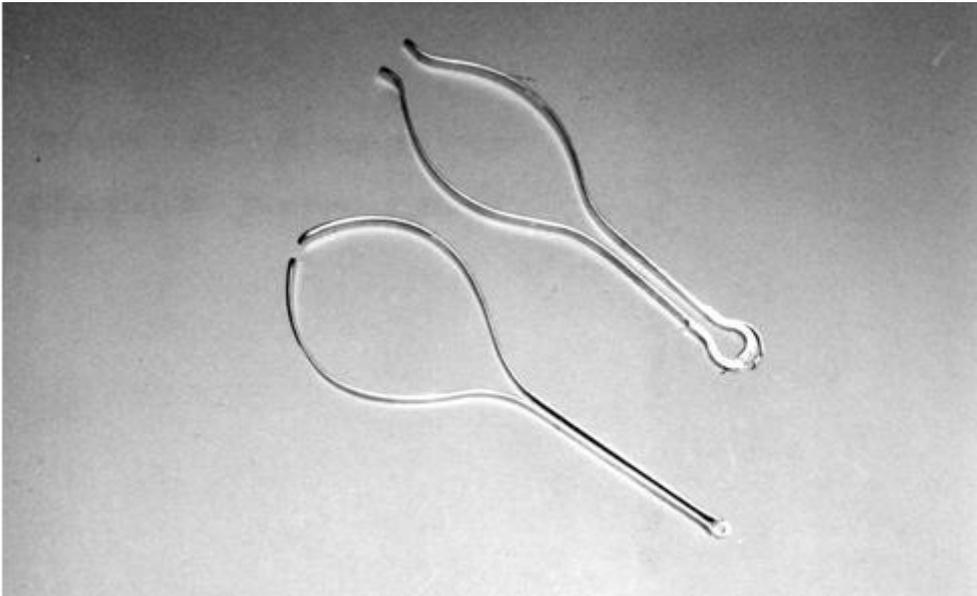


Figure 5: Rathlauw's version of Van Roonhuysen's forceps (above) and Schlichting's forceps (below), originally leather covered. (Science Museum, London).

Meanwhile in the low countries there were various inventors of instruments, most of whom imposed secrecy and displayed cunning and deception. Theories abound about these goings on and are summarised

by Hibbard (2000).⁷ Palfyn (1650-1730) devised his *mains de fer* in about 1716 and various versions have been described (Figure 4). However they were ineffective because of the shape of the blades and failure to devise a suitable locking mechanism. The Van Roonhuysen family in Amsterdam developed a flexible forceps and a lever and made much money by keeping the instruments secret. Students were expected to purchase the secret before being granted their licence to practice from the College. However a disenchanted and revengeful pupil, Jan Rathlauw, published a description of the forceps in 1747.⁸ Rathlauw improved the design and added a pin lock (Figure 5).

Early 18th century progress

By the middle of the 18th century a new breed of men-midwives were establishing themselves. William Smellie (1697-1763) was the outstanding figure of the age. He was born in Lanarkshire and practised there before coming to London in 1739. Smellie's clinical practice was predominantly among the poor. He was never on the staff of a lying in hospital or attended a 'lady'. He began teaching in 1741 and, according to his advertisements in the London Advertiser, he charged £2.2s for 12 lectures, including demonstrations on 'machines'; £1.1s to witness labour; £5.5s for 2 courses, 4 labours and conduct one delivery.

In his 'Treatise' (1751) he gave the first accurate description of the mechanism of parturition and the curves of the birth canal. Many of his illustrations came from his own hand as he was a highly competent artist.⁹ The Treatise was written with some elegance, unlike much of his correspondence, and it is likely that his books were 'ghosted' by his friend and fellow doctor from Lanarkshire, Tobias Smollett.

For the first 13 years of his obstetric practice Smellie's only instruments to assist delivery were crotchets and hooks, as had been used for centuries, and the perforator and lever. His interest in forceps arose from a desire '*to avoid this loss of children which gave me great uneasiness*'. His first experience with forceps was in 1737, using a pair of French forceps recommended by Mr. Butter of Edinburgh which were in fact Duseé's forceps and were 17" long. He found them '*so long and ill-formed that I could not introduce them safely to take a proper hold*'.

⁷ B.M. Hibbard, *The Obstetrician's Armamentarium* (San Anselmo, Norman Publishing, 2000).

⁸ J. P. Rathlauw, *Het berugte geheim in de vroedkunde, van Rogier Roonhuysen ontdekt en uitgegeven op hooge order door Jan Pieter Rathlauw, vroedmeester* (Amsterdam, Zacharias Romberg, 1747).

⁹ W. Smellie, *Treatise on the Theory and Practice of Midwifery* (London, Wilson, 1751).

He therefore set about designing his own instruments, with features which have endured to this day, including the ‘English lock’ and the pelvic curve, although about that time the latter was also being introduced in France by Levret. He was also the first person to describe rotation of the head with the forceps – ‘...*this method succeeding so well gave me great joy*’. Smellie recommended that the forceps ‘*should be so short in the handles that they cannot be used with such violence as will endanger the woman's life*’, a sentiment reiterated by Wrigley exactly 200 years later when he was concerned with the abuse of the forceps operation. Smellie’s early blades, which were slender and broadest near their tips, were made of iron, covered with leather and lubricated with hogs lard. Later the blades were wrapped in thinner material which was changed between cases (though not every time!) to reduce the risk of transmitting venereal infection.

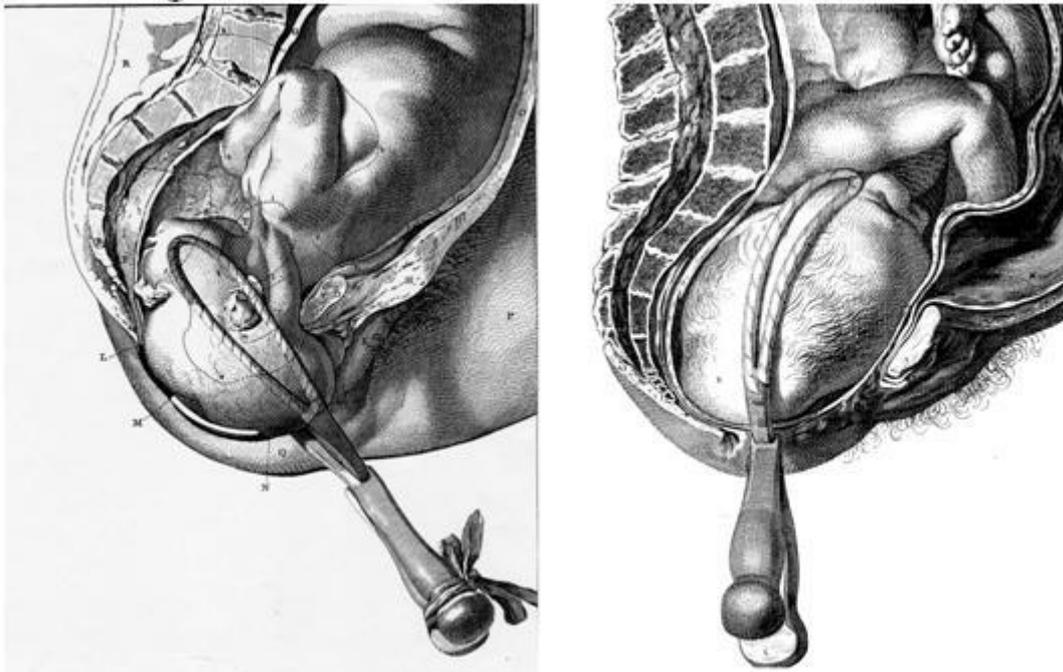


Figure 6: Smellie’s straight forceps used at the pelvic outlet (Left) and his curved forceps for delivery from the mid-cavity (Right) The curved forceps were also used for rotation of the head. Note the leather binding on the blades.¹⁰

It was not uncommon for practitioners to openly publish attacks on the skill and integrity of their competitors in books, essays and pamphlets which they published themselves, unhampered by modesty, fear of libel,

¹⁰ W. Smellie, *A Sett of Anatomical tables, with Explanations, and an Abridgement, of the Practice of Midwifery, with a View to Illustrate a Treatise on That Subject, and Collection of Cases* (London, Published by the Author, 1754).

peer reviewers or the Trade Description Act. Midwives were again feeling threatened and were reactionary, as ever. One Mrs Nihell was one of the most prominent campaigners and in 1760 published *The Professed Midwife*, a somewhat venomous attack on this new breed of obstetricians and on Smellie in particular, whom she identified as the leader, using the forceps as a means of entry into midwifery practice.¹¹ One of Smellie's fiercest critics was Dr Burton of York, who claimed that one of his own instruments, his 'Lobster Claw' forceps with a screw mechanism to appose the blades (Figure 7) were 'better than any yet'.^{12,13} In fact it is uncertain to what extent he ever used this device as it was well known that his standard armamentarium included a long forceps of the Duseé pattern (see below).



Figure 7: Burton's 'lobster claw' forceps. The blades were apposed by a screw mechanism concealed in the shank.

Burton was not a popular man and antagonised the Archdeacon of York, Laurence Sterne, who rewarded him with immortality in the thin disguise of Dr. Slop in *Tristram Shandy*.¹⁴ Slop, having damaged Uncle Toby's hand during a demonstration of his forceps, has an argument as to whether the head or breech is presenting (the midwife being right) and eventually delivers Tristram with forceps. He then goes missing and on enquiry it is reported that '*in bringing him into the world with his vile instrument he has crushed his nose, Susannah says, as flat as a pancake to his face - and he is making a false bridge with a piece of cotton and a thin piece of whalebone from Susannah's stays....*'

William Hunter (1718-1783) came to London from Lanark in 1740 and initially lodged with Smellie. Although they were from similar backgrounds they were very different personalities. Smellie retained his humble and provincial life style and did not pursue the social round.

¹¹ E. Nihell, *A Treatise on the Art of Midwifery*, (London, Morley, 1760).

¹² J. Burton, *A Letter to William Smellie MD* (London, Owen, 1753).

¹³ J. Burton, *An Essay towards a Complete New System of Midwifery* (London, Hodges, 1751).

¹⁴ L. Sterne, *The Life and Opinions of Tristram Shandy, Gentleman* (London, Chidley, 1847).

Hunter moved to live in the household of Dr James Douglas, a fashionable obstetrician as well as a well known anatomy teacher. He soon had an ultra-fashionable medical practice and was appointed as Physician to Queen Charlotte in 1762. He made full use of the social and cultural opportunities which came his way in this flourishing era of Handel and Hogarth, Fielding and Smollett, Garrick, Reynolds and Gainsborough.

Hunter frequently alluded to Smellie's teaching during his lectures, often favourably but sometimes critically, particularly suggesting that he was too interventionist. He was reputed to carry with him a pair of rusty forceps which he would show to his students to emphasise how little they were used - not surprisingly considering his society practice was of potentially normal cases compared with Smellie's clientele amongst the rachitic poor, to whom in most cases he was called only when problems had already developed.

The guidelines for the use of forceps in the time of Smellie and Hunter are summarised as follows:

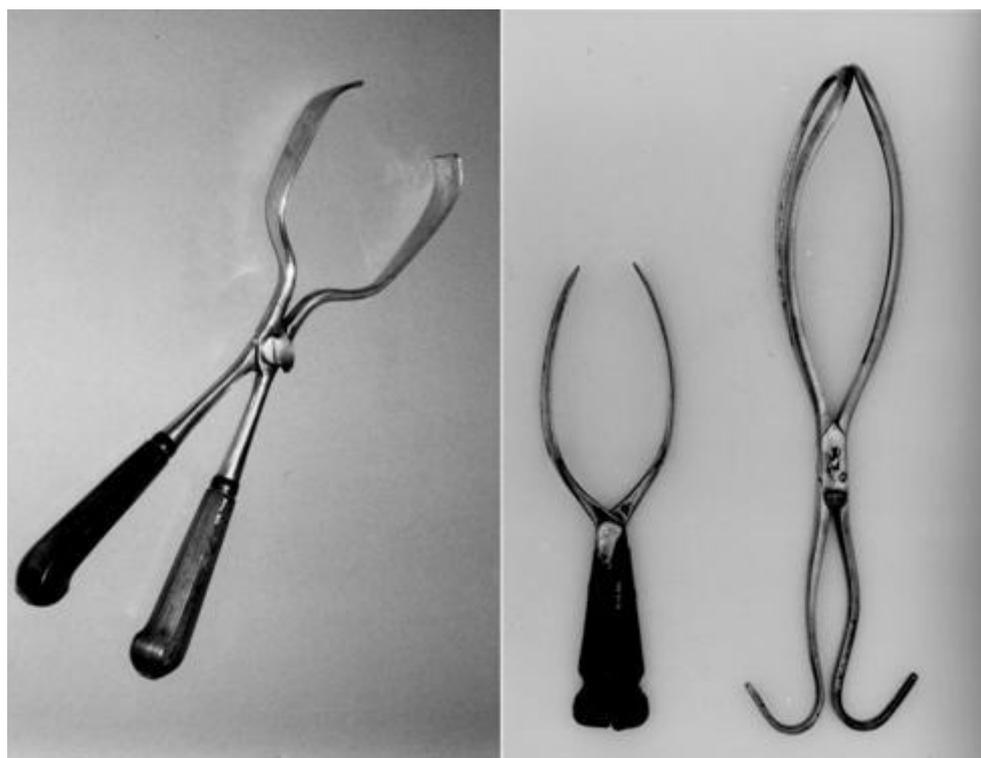


Figure 8: Left- Dusée's forceps (length 42cm); Right- Smellie's straight forceps (length ca.28 cm) and Levret's forceps (length 39.5cm).

'Use only on the most urgent occasions

'Head on the perineum for 6 hours

'If the head advances, no matter how slowly, no interference unless the child be dead

‘Use the forceps sparingly – ‘Where they save one they murder many’

Meanwhile there were major developments on the continent and especially in France. Dusée’s Forceps (Figure 8, left) were long (ca. 42cm) and heavy. They were in widespread use on the Continent and had spread to Britain via Edinburgh. But the outstanding figure of the time was André Levret (1703-1780). His book *L’Art des accouchemens démontré par les principes de physique et de mécanique* earned him the title of founder of rational obstetrics.¹⁵ He devised many instruments, including his three bladed *tire-tête* for extracting the decapitated head. His many forceps started with modifications of Palfyn’s *mains de fer* and evolved into sophisticated and highly effective instruments. He experimented with various articulations but never emulated the simplicity of Smellie’s cross-over lock (Figure 8, right). Just as Smellie’s relatively light, short and simple forceps became the prototype for British developments, so Levret’s longer, heavier and more complex forceps were the model for subsequent European designs.

Late 18th and early 19th centuries

Smellie retired to his native Lanark in 1759. Unfortunately in London rational conservatism went with him, leaving the way open for a large number of undistinguished practitioners to shoot from the hip with their new found weapons, often with disastrous results. So it was that a degree of polarisation developed, with interventionists at one extreme and conservatists in the mould of William Hunter at the other. There was little further refinement in forceps design for decades to come. Most changes were quite minor, in order to obtain a better grip and to reduce maternal soft tissue damage

The most influential of the conservatists was Thomas Denman (1733-1815), who had been a pupil of Smellie. He succeeded William Hunter as the leader in the field, becoming Court Physician. His *Introduction to the Practice of Midwifery* (1788) became a standard text which went into many editions.¹⁶ As a means of avoiding operative delivery he introduced the concept of inducing labour prematurely so as to have a baby of smaller size which could negotiate a contracted pelvis.

¹⁵ A.Levret, *L’Art des accouchemens, démontré par des principes de physique et de mécanique* (Paris, Le Prieur, 1753) (2nd edn, Paris, Didot, 1761).

¹⁶ T.Denman, *Introduction to the Practice of Midwifery*, 1st edn (London, Johnson, 1788). 7th edn, with biography (London, Cox, Burgess and Hill, 1832).

Although he designed his own forceps he remained a proponent of the lever, or vectis. He taught that the forceps should be used only when there was '*total want or deficiency of the natural pains of labour*'. In relation to the problem of concealed post-partum haemorrhage he said that he had '*...not even troubled myself with the state of the uterus.....*'. Both of these principles were destined to have dire consequences.

Whilst conservatism remained the order of the day in England, on the Continent the approach to difficult delivery was more intrepid and traumatic especially in the early-mid 19th century. Their forceps were longer and heavier, with opportunity for enormous traction force and they had an incredible ardour for inventing instruments which were sometimes useless, often dangerous, but always ingenious. The continental approach is also reflected in the frequency of forceps delivery, as shown in the collected data of Fleetwood Churchill (1841),¹⁷ with rates of the order of 6/1000 on the Continent and in Edinburgh, two - four times the rate for England and Ireland, where craniotomy was still rife. Thus it was that on the Continent there were disastrous sins of commission, unlike the British sins of omission.

The Princess Charlotte tragedy

The culmination of British conservatism concerned the obstetric management of Charlotte Augusta, daughter of George, Prince of Wales (later George IV) and Princess Caroline, during her pregnancy in 1817 which was expected to produce an heir to the throne.

The backgrounds of her three medical attendants, Sir Richard Croft, Mathew Baillie and John Sims are both interesting and relevant. The first two were married to the twin daughters of Thomas Denman. Sims' involvement was minimal. Although he was a Court Physician he was aged 68 at the time in question and his expertise was in botany.

The first stage of the Princess' labour was slow, lasting 26 hours. After 24 hours in the second stage of labour, she delivered a large stillborn boy. There was difficulty with the placenta, which had to be removed by exploring the uterus. Abdominal binders were applied, as was the custom of the day. Three hours after delivery she became unwell, deteriorated steadily and died at 2.30 a.m. Death was apparently due to concealed haemorrhage, probably aggravated by pre-existing anaemia, blood letting and prolonged labour and exhaustion. With the mother and baby dead the royal line of succession was broken. The whole episode

¹⁷ F. Churchill, *Researches on Operative Midwifery*. (Dublin, Keene, 1841).

proved too much of a strain for Sir Richard Croft and three months later he shot himself with pistols to each temple.¹⁸

With this triple tragedy the Hunterian/Denman legacy of conservatism was about to be challenged.

The shadow of the Charlotte tragedy persisted, and was likely to do so until the Royal succession was safe, for George IVth's twelve living children had shown themselves as particularly incompetent at producing legitimate offspring. At last, in 1819 the Duchess of Kent became pregnant and one David Daniel Davis was appointed by the Duke of Kent as Accoucheur.

David Davis (1777-1841) was born in West Wales, the son of a farmer. He settled in London and in 1827 became the first Professor in Midwifery in the University of London at University College. Davis' magnum opus was *Elements of Operative Midwifery*, first published in 1825. His writings show clearly how different he was from those who had started him on his career.¹⁹ He pleaded for better training, better design of instruments and more ready recourse to intervention in the interests of both mother and baby, claiming that '*...the entire subject of Operative Midwifery has been in a state of the most abject neglect for the last fifty years.*'. He designed numerous pairs of forceps for use in various circumstances and was particularly concerned to minimise injury to the baby (Figure 9). His destructive instruments were so constructed to reduce the risk of maternal trauma – '*The changes in forms, or additional parts are... intended to add to the security and facility of the operations to be performed with them*'.

Mid-late 19th century

Further mechanical innovations and ingenuity, and the introduction of anaesthesia, resulted in the development of axis traction and opportunities for manoeuvres not humanely possible previously. Also, for the British, the development of carbon steel, and later, stainless steel, gave advantages in lightness and strength. The advent of heat sterilisation saw the disappearance of wood and ivory handles. Forceps were specifically designed for dealing with the problems of the day – the small, often rhachitic pelvis; long labours; and the fetal head with gross moulding or high above the pelvic brim.

¹⁸ J. Dewhurst, *Royal Confinements*, (London, Weidenfield and Nicolson, 1980).

¹⁹ D. D. Davis, *Elements of Operative Midwifery* (London, Hurst Robinson, 1825).

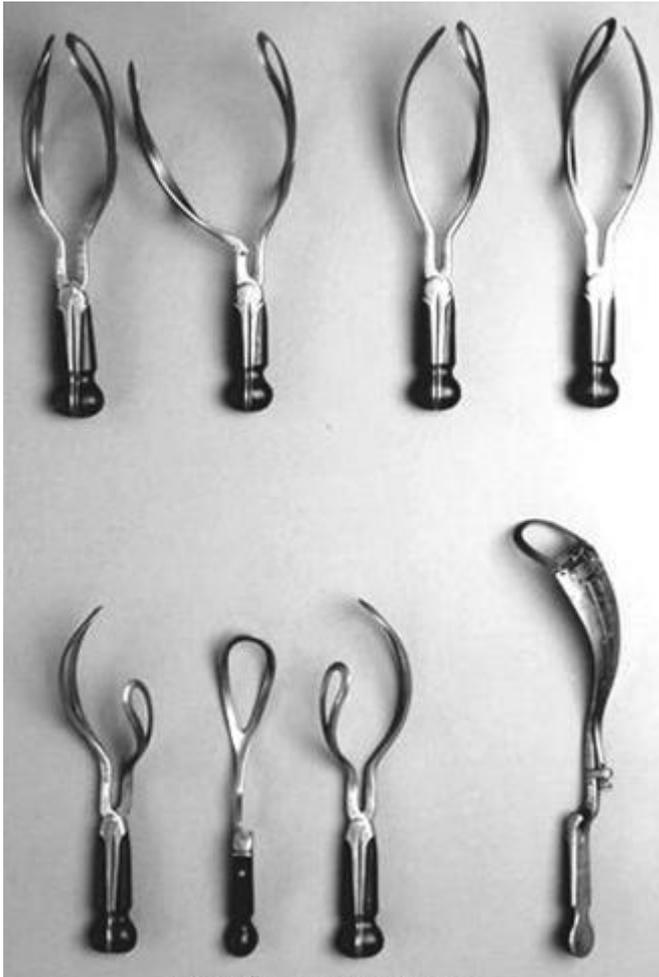


Figure 9: David Davis' forceps. Although shown in pairs all the blades were interchangeable to facilitate their use in almost any malpresentation. Note the hinged shank in the second pair; this was to facilitate introduction when the patient was lying on her side.

Long forceps were already standard on the Continent and became popular in Britain, with such enduring designs as those of JY Simpson (1848) who, having travelled extensively, claimed that in his design he used all that was best from Europe; Barnes, which were longer and flatter; and Anderson, who combined the features of Simpson and Barnes (Figure 10).²⁰ The commonest indication for their use was to avoid craniotomy in cases of brim disproportion.

²⁰ J. Y. Simpson, 'On the Mode of Application of the Long Forceps', *Edin. Monthly J. Med. Sci.*, **9** (1848), 193–196.



Figure 10: JY Simpson's long forceps and common variants in detail.
L-R. Simpson, Barnes, Anderson..

When the head was at the pelvic brim or thereabouts, and considering the curve of birth canal, perineum and coccyx, there was difficulty in pulling in the right direction. This dominated the thinking of many mid- and late 19th century obstetricians, leading to the development of axis traction forceps. Initially, a simple attempt to improve the direction of traction was to insert tapes through the fenestra of the blades. In 1868 Aveling²¹ introduced the perineal step which greatly reduced perineal trauma and several others, including Galabin (1877) and Wagstaff (ca. 1890) followed this lead (Figure 11).²²

²¹ J. H. Aveling, 'On the Advantages to Be Gained from Curving the Handles of the Midwifery Forceps', *Brit. Med J.*, 2 (1870), 528.

²² A. L. Galabin, 'Axis Traction Forceps', *Trans. Obstet. Soc. London.*, 19 (1877), 227–231.

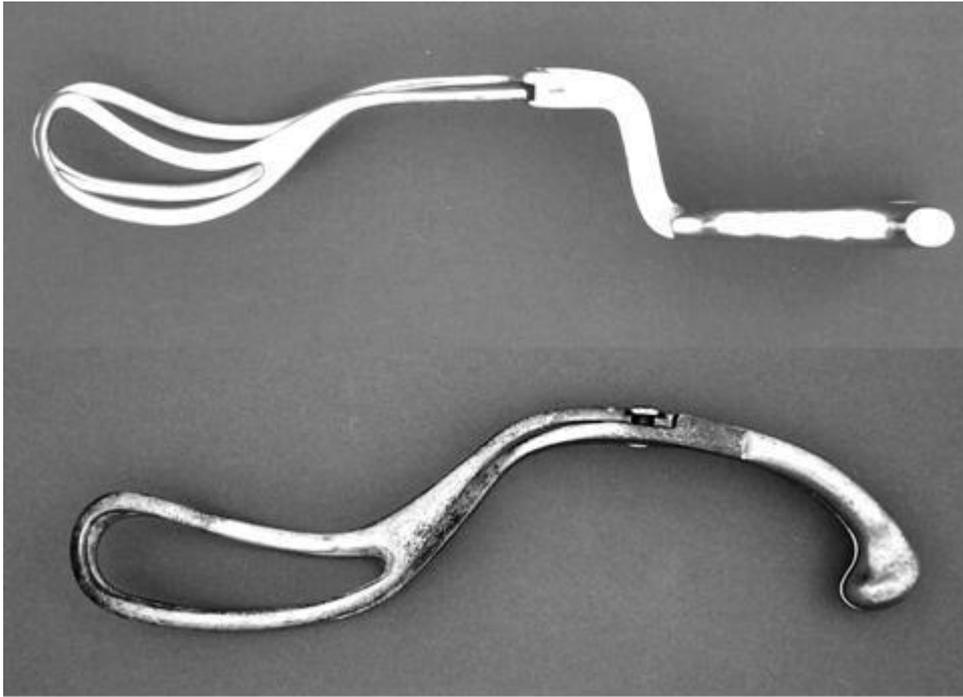


Figure 11: Above: Aveling's forceps, intended to facilitate insertion and traction. They were not very satisfactory. Below: Galabin's forceps. The stepped shank allowed better axis traction and reduced perineal trauma. The heavier design allowed greater traction force.

Meanwhile more complex designs were appearing in Europe. Hubert (1860) introduced fixed traction rods and Tarnier (1877 onwards) was the first to introduce hinged rods on the blades (Figure 12).^{23,24} He spent many years trying to perfect his instruments, producing new modifications at frequent intervals. However, their complexity made them expensive to manufacture and difficult to assemble and apply.

²³ E. Hubert, 'Du forceps; théorie de la traction et nouveau forceps', *J. des sciences médicales de Louvain*, 2 (1877), 145–157, 291–297.

²⁴ E. Tarnier, *Description de deux nouveaux forceps* (Paris, Lauwereyns, 1877).

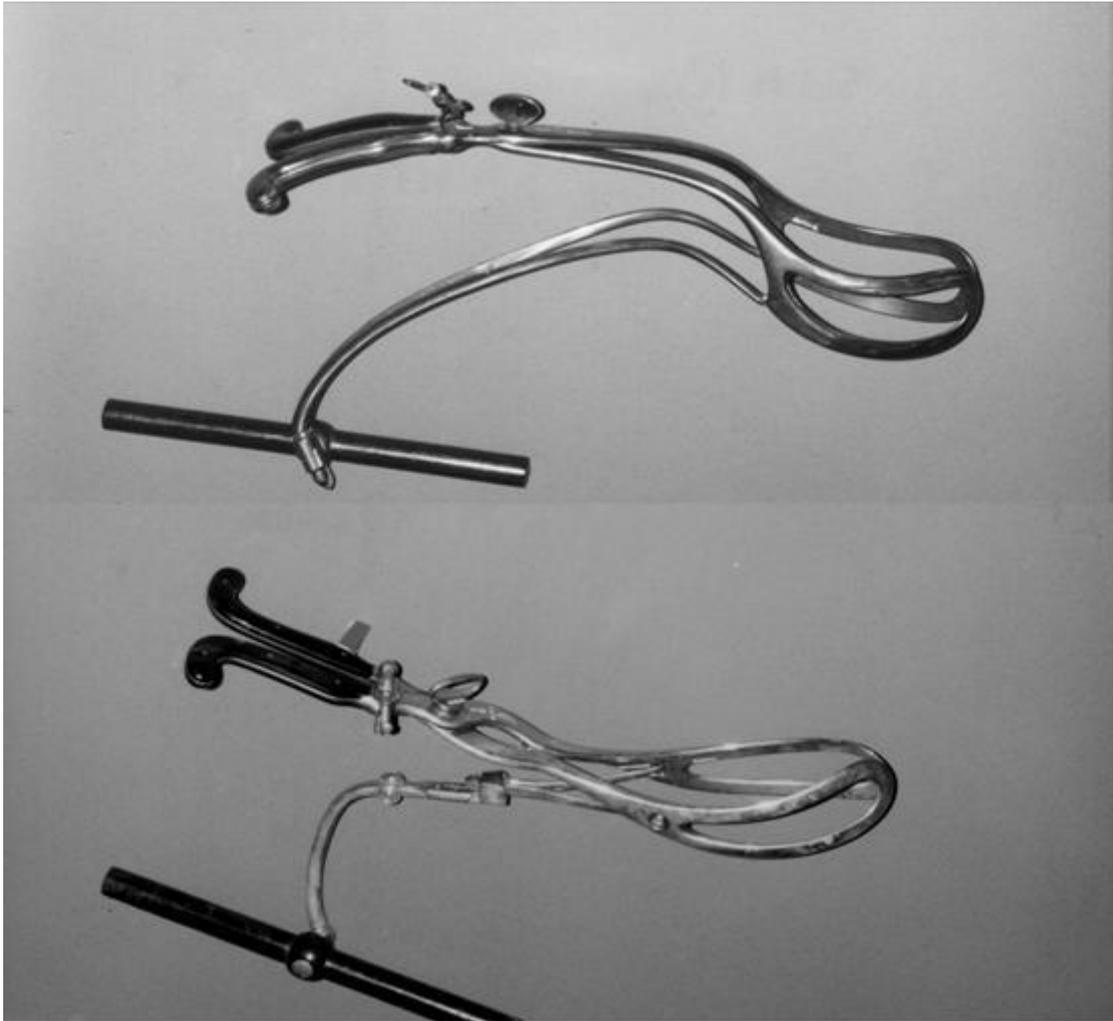


Figure 12: Tarnier's forceps. Two of his many designs, showing increasing complexity. The long hinged traction rods lying in the birth canal and the difficulty in insertion increased the risk of trauma.

There was a need to return to simplification and Milne Murray (1891) applied mathematical principles to his design (Figure 13).²⁵ Neville (1886) sought a practical compromise and found that a detachable angled handle attached to the shank of the forceps was almost as mechanically efficient as more complex designs, did not involve inserting additional ironmongery into the birth canal and was inexpensive.²⁶ Although he designed his own long forceps the traction rod was taken up by many other designers. In particular, the Neville-Barnes forceps endured through at least the first half of the 20th century even though it had become inappropriate for the needs of the time.

²⁵ R. M. Murray, 'The Axis-Traction Forceps; Their Mechanical Principles, Construction, and Scope', *Trans. Edin. Obstet. Soc.*, 16 (1890-1891), 58-89.

²⁶ W. C. Neville, 'Axis-Traction in Instrumental Delivery, with Description of a New and Simple Axis-Traction Forceps', *Dublin J. Med. Sci.*, 81 (1886), 97-109, 295-298.

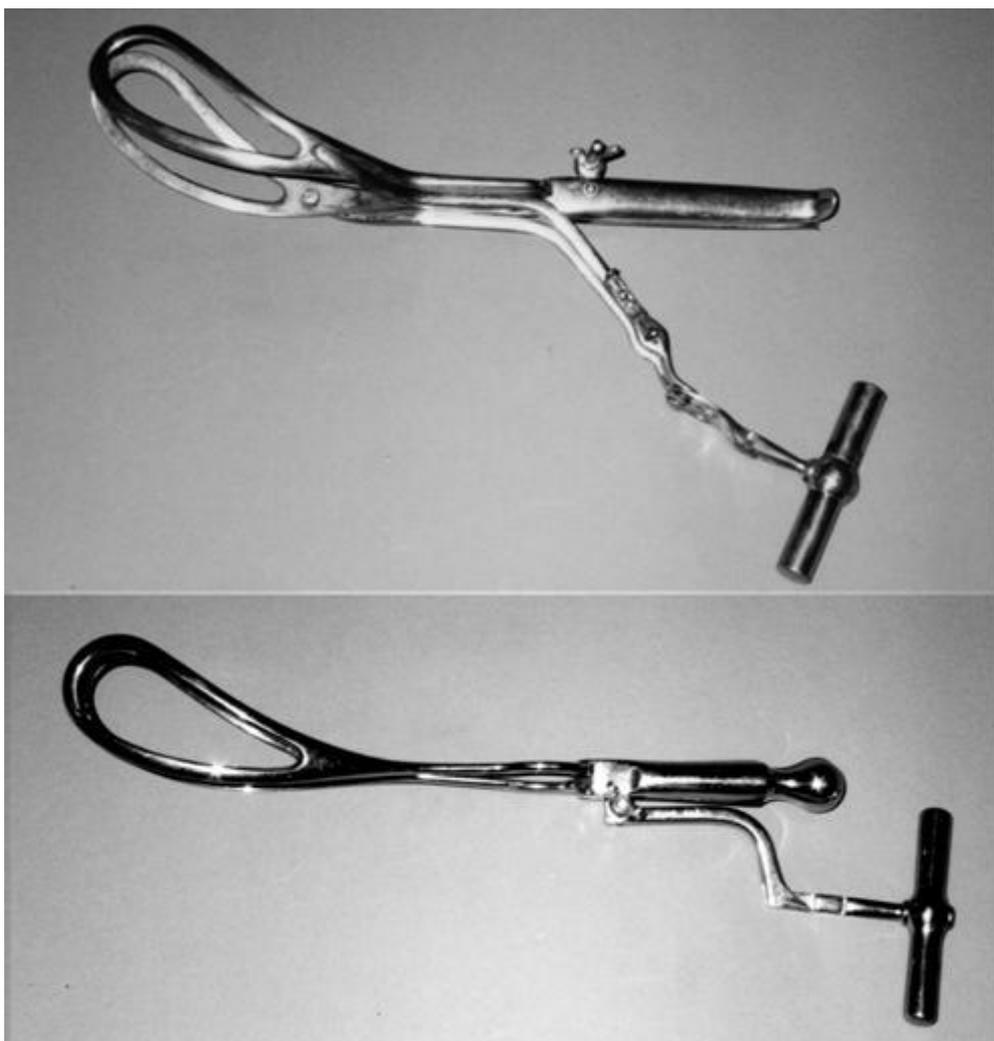


Figure 13: Above: Milne Murray axis traction forceps with detachable rods. Below: Neville-Barnes forceps, with a simple, detachable, non-invasive traction handle.

20th century trends

Traditions die hard and changes came slowly during the 20th century; the designs of the mid 18th-19th centuries continued to be used. However fetal considerations became more dominant and Caesarean section became safer. High forceps delivery (when the head was above the pelvic brim) became obsolete; more caution was used in the application of mid-cavity forceps; and rotation of the head, either manually or with forceps, diminished almost to the point of extinction. Therefore most forceps deliveries were from the lower birth canal or outlet. However there were some notable exceptions. Kielland's (1915; Figure 14) and Barton's (1928) forceps were specifically designed to allow rotation of fetal head

in cases of deep transverse arrest in the mid-pelvic cavity and ingenious adjustable instruments, such as those of Hay and Moolgaeker had short periods of popularity.^{27,28}

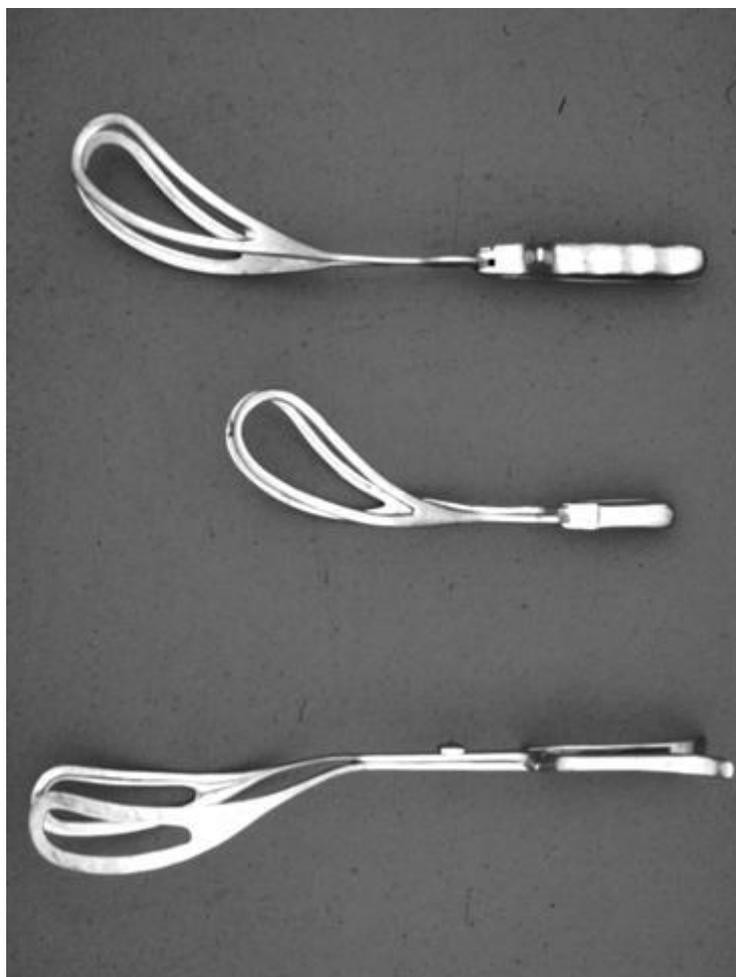


Figure 14: Comparison of forceps in common use in the 20th century. Above: Anderson; Centre: Wrigley; Below: Kielland

By the 1930's critics of the 19th century designs were becoming more vocal. Miles Phillips (1933) said that '*Long curved forceps might well be kept in the Town Hall and be only available on a magistrates order*',²⁹ The great requirement was for short forceps of size and shape for modern needs so that the fetal head was to some degree protected rather than compressed. This was achieved by modifying Simpson's short forceps design, with a small handle, a short shank with a finger ring and an

²⁷ C. Kielland, 'Eine neue Form und Einführungsweise der Geburtszange, stets biparietal an den kindlichen Schadel gelegt, *Munchen Med. Wchnschr.*, 62 (1915), 923.

²⁸ L.G. Barton, W.E.Caldwell and W.E. Studdiford. 'A new obstetric forceps', *Am. J. Obstet. Gynec.*, 15 (1928), 16-26.

²⁹ M. Phillips, *Edin. Med. Journ*, 40 (1933), 140.

increased cephalic curve. Wrigley (1935; Figure 14) found that 64% of forceps deliveries were in primigravidae for whom a short, light forceps was appropriate and condemned ‘heavy long forceps’ designed to compress the head, the use of which continued only from weight of tradition and by being virtually indestructible.³⁰ He therefore designed his own instrument which has stood the test of time and is a modern version of Smellie’s curved forceps, with measurements to meet modern needs. Instrument makers usually work from pattern models rather than from technical drawings and there were no recorded specific measurements for Wrigley’s original design – this was left to his junior colleague, Phillip Rhodes (1960), who published suitable compromise measurements. Nevertheless, long forceps remained in common use for another half century.³¹

A collateral development came in the middle of the century. In 1849 Simpson had devised, but discarded, a vacuum extractor, or ventouse.³² Others had also experimented unsuccessfully with the principal but it was not until the mid-20th century that Malmstrom described a ventouse which, with modifications, largely replaced forceps in many units.³³

Now, in the 21st century, Caesarean section dominates as the solution to difficult delivery. In 1950 the Caesarean section rate in the UK was about 3%. In 2006 it had risen to 24%, with a range of 12.5%-34.6% between hospital trusts. Clearly the debate still has a long way to go.

Perhaps we need to remind ourselves of the constant attention to detail shown by our forebears in the assessment and management of difficult labours. We continued to use forceps designed for other needs a century and a half ago but had we turned as much attention to the modern needs and design of forceps as they did, and as we have done trying to perfect the Ventouse I wonder what the pattern of assisted delivery would be today. The hope for the future is that these thoughts may stimulate the search for optimal strategies for assisted delivery. In the words of Thoreau ‘*Even old roads may be sometimes profitably trodden*’.

³⁰ A.J. Wrigley, ‘The Forceps operation’, *Lancet*, 2, (1935), 702-705.

³¹ P. Rhodes, ‘A Standard Obstetric Forceps’, *Lancet*, 2, (1960), 631.

³² J. Y. Simpson, ‘On a Suction Tractor; or New Mechanical Power, as a Substitute for the Forceps in Tedious Labours’, *Edin. Monthly J. Med. Sci*, 9 (1849), 556–559.

³³ T. Malmstrom, ‘The Vacuum Extractor’, *Acta Obstet. Gynec. Scand.*, 33, Suppl. 14.