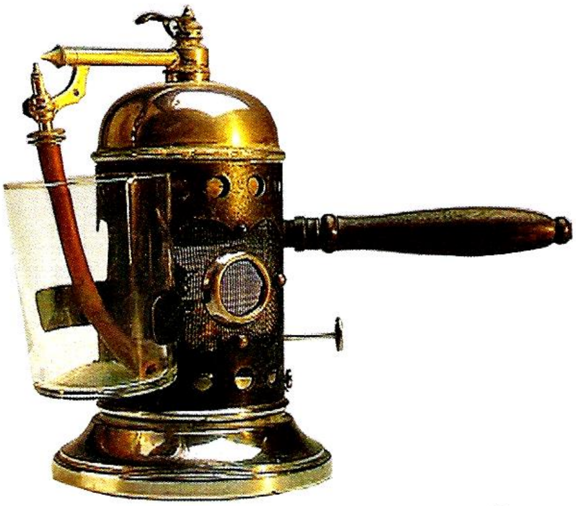
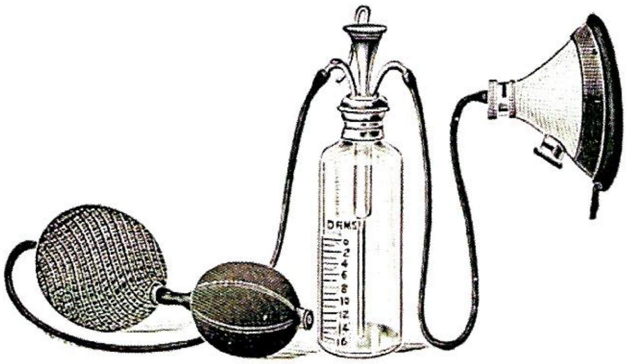
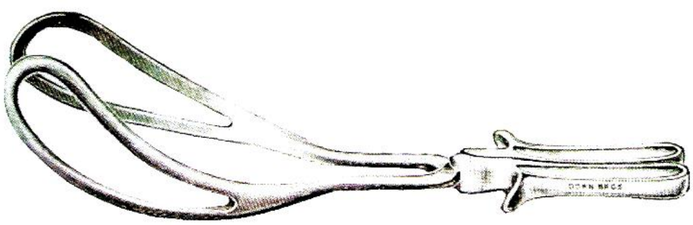




The Historical Medical Equipment Society



BULLETIN NO. 31 ISSN 1366 - 4719 AUGUST 2016

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CONTENTS

NEXT MEETING OF THE SOCIETY :

FRIDAY 21st APRIL 2017
At the Royal College of Physicians, London

EDITORIAL

Twenty-four members and guests attended the meeting of the HMES held on Friday 15 April 2016 at the British Association of Urological Surgeons (BAUS) in the Nuffield Building, Royal College of Surgeons. We owe thanks to Jonathan Goddard and Anne Bishop, chief executive of BAUS, for their help organising the meeting and allowing us to use the committee room. Jonathan is a new member of the HMES and works as a urological surgeon at Leicester General Hospital. He is the honorary curator of the BAUS museum of urology. Although there is a small display of objects in the BAUS office Jonathan has constructed an award-winning online virtual museum http://www.baus.org.uk/museum/ The site includes the history of urology, famous urologists and specialist hospital and an excellent section on surgical instruments all nicely illustrated, informative and well worth a 'virtual visit'.

The main theme of the meeting was urological instruments and procedures. Jonathan demonstrated the workings of an early endoscope designed by the Irish surgeon Sir Francis Cruise FRCPI MD (1834-1912) in the 1850s-60s. The instrument used a bright oil lamp to reflect light through a mirror down various endoscopic tubes. It was used mainly as a cystoscope and allowed Cruise to perform some of the first endoscopic operations on the urethra and bladder. This instrument has been in the Beswick Collection of the University of Manchester Medical Museum for many years, but its significance and mechanisms have only recently been recognised since Jonathan's investigations. Professor Adrian Thomas's paper on Edwin Hurry Fenwick FRCS (1856-1944) continued the history of the cystoscope. Fenwick's work at St Peter's Hospital for the Stone and the London Hospital advanced the use of electrically-lit cystoscopes, urological radiology, and clinical urology. Some examples of early contrast urography were of special interest. Mick Crumplin provided a lucid account of military surgery at the Battle of Waterloo. Cannon, grapeshot and musket balls caused horrendous injuries and the chaos of thousands of casualties must have overwhelmed the field surgeons trying to evacuate them, nevertheless over 2000 amputations were carried in temporary hospitals set up in farmhouses. Surgeon Charles Bell made a series of striking paintings of the soldiers' terrible injuries. The French military surgeons under Dominique Larrey (1766-1842) were perhaps better organised with horse ambulances and an early triage system. Ravi Kunzru, Tim Philp & V Mahadevan presented a remarkable piece of historical surgical research into the cystolithotomy technique practiced by the Indian surgeon Suśruta in the mid-first-millennium BCE. After personally translating and updating the ancient text, *Suśrutasamhita*, they reproduced the operation of 'cutting for a bladder stone' on two male cadavers. The stone had to be massaged down into the perineum before the carefully positioned incision released it. Adrian Padfield outlined the history of the Royal Humane Society (1787) and their resuscitation apparatus. The Society awarded medals and financial rewards for the rescue of drowning persons from rivers and canals and also provided sets of hand-pumped bellows and tubing to act as resuscitation equipment to stimulate breathing and administer tobacco smoke enemas. The final paper provided a brief history of urinary catheters, bougies, sounds and special instruments to treat urethral strictures. Various instruments from the Beswick Collection, University of Manchester Medical Museum were demonstrated during the talk. Finally curator Bruce Simpson, took us on a short tour of the RCS Hunterian Museum.

John Prosser chaired a short business meeting. He was optimistic for the future of the Society and it was agreed to hold another meeting in April 2017 in or near to London. Peter Mohr and Ravi Kunzru would explore possible venues including the Science Museum and Wellcome Centre. Honorary treasurer Adrian Padfield submitted up-to-date accounts. The annual subscription due in September 2016 remains £10 single & £15 joint. Tim Smith agreed to produce a further *Bulletin*.

Peter Mohr

[Papers in the Bulletin are normally in abbreviated format (600-800 words). However the papers of Ravi Kunzru and Jonathan Goddard are here produced in full, hence the larger than usual Bulletin. TGCS]

THE CRUISE ENDOSCOPE

JONATHAN CHARLES GODDARD

From the earliest times healers have accessed the bladder via the urethra but this was done blindly, by feel, they couldn't see. The greatest challenge in the history of urology has been to visualise the urinary tract through the natural orifice of the urethra. The key to endoscopy and its development has always been the ability to manipulate light into the deep cavities of the body.

The earliest accepted attempt at a practical endoscope was by Philip Bozzini (1773-1809), of Mainz, Germany in 1807; the Lichtleiter, was essentially a speculum, which could be passed into a variety of body cavities illuminated by the light of a beeswax candle. Other endoscopes that used candlepower as their light source were subsequently introduced. Pierre Sègalas (1792–1874) of France, in 1826 attempted to improve on the Lichtleiter by adding a second candle. In America, John Fisher (1798-1850) and in England John Avery both contributed candle lit endoscopes. In 1867, Mr Richard Archer Warwick from London introduced an instrument that used natural north light. Although simple in design it did receive some praise from the exacting Sir Henry Thompson. He felt it answered nearly every purpose of the larger, more cumbersome and expensive models but it was still not good enough for practical use.

In 1853, the French surgeon Antonin J. Desormeaux (1815–1894) presented his version of a cystoscope to the Imperial Academy of Medicine in Paris; his light source was an oil lamp burning a mix of alcohol and turpentine giving a bright but rather hot and smoky light. He called this fuel mix gasogene. It enabled Desormeaux to diagnose diseases of the urethra and treat them. Desormeaux changed the name urethroscopy to the new term, endoscopy. This led Archer Warwick to give Desormeaux the title of 'The Father of Endoscopy'.

At some point after 1853 and prior to 1865 a Desormeaux endoscope, or one very similar, was acquired by Francis Cruise (1834 – 1912) a Dublin surgeon. Cruise was disappointed with its poor illumination and soon abandoned it. However, some time later he returned to the idea of endoscopy and planned to improve on Desormeaux's design. On March 15th 1865 Francis Richard Cruise presented his version of the endoscope to the Medical Society of the King and Queen's College of Physicians of Dublin.

Francis Richard Cruise

Cruise was born in Mountjoy Square, Dublin in 1834; the son of a solicitor [fig 1]. He studied medicine at Trinity College and the Richmond Hospital under Sir Dominic Corrigan and Robert McDonnell (McDonnell incidentally performed the first blood transfusion in Ireland in 1865). He graduated in 1858 and travelled in America re-

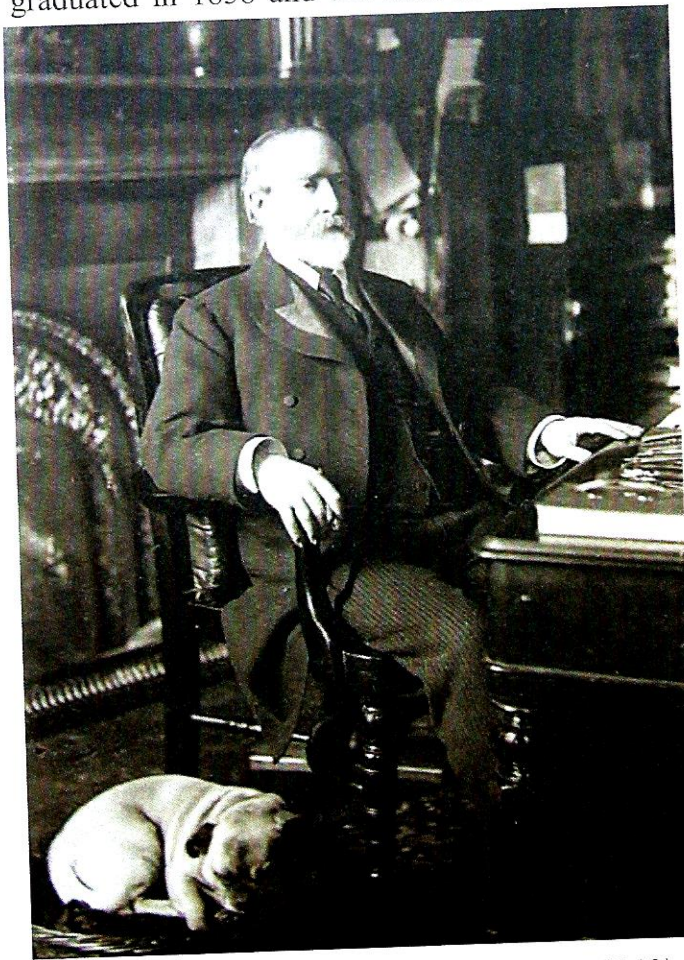


Fig.1 Sir Francis Richard Cruise (1834-1912) [image provided with kind permission of the Royal College of Physicians of Ireland]

turning to Ireland in 1859 when he was granted his Licentiate from the Royal College of Physicians of Ireland; he was elected as a Fellow of the College in 1864. His MD was granted by Trinity College in 1861; his thesis was on the abnormal development of the female genital organs. In 1859 he married Mary Frances and they had six sons and three daughters. Cruise began his work as a junior physician in the Mater Hospital when it opened in 1861. He also lectured at the Carmichael School and was later President of the Royal College of Physicians of Ireland from 1884 to 1886.

The Cruise Endoscope

According to Cruise, he had found the prospect of viewing the interior of the body and its cavities in a living subject fascinating since his student days. Certainly the Desormeaux endoscope had been first introduced during Cruise's time at Trinity. He also made it clear he had tried a Desormeaux type endoscope some years prior to presenting his own. Cruise's main criticism of the Desormeaux endoscope was the dearth of light projected into the body cavity. Although he used his endoscope to look into various body cavities it appears that the urethra was the area most frequently examined. Clearly, in order to examine the length of the male urethra, a tube or speculum needs to be long and narrow. Thus, in order for light to penetrate to the end of this long tube the source had to be very bright indeed and Cruise acknowledged this to be *'the grand difficulty'* of endoscopy. Cruise, after some experimentation found that the thin edge of a flat petroleum lamp flame was the brightest light source available [fig 2]. The light intensity was further improved by the addition of camphor to the petroleum fuel. He added ten grains of camphor to each fluid ounce of petroleum.

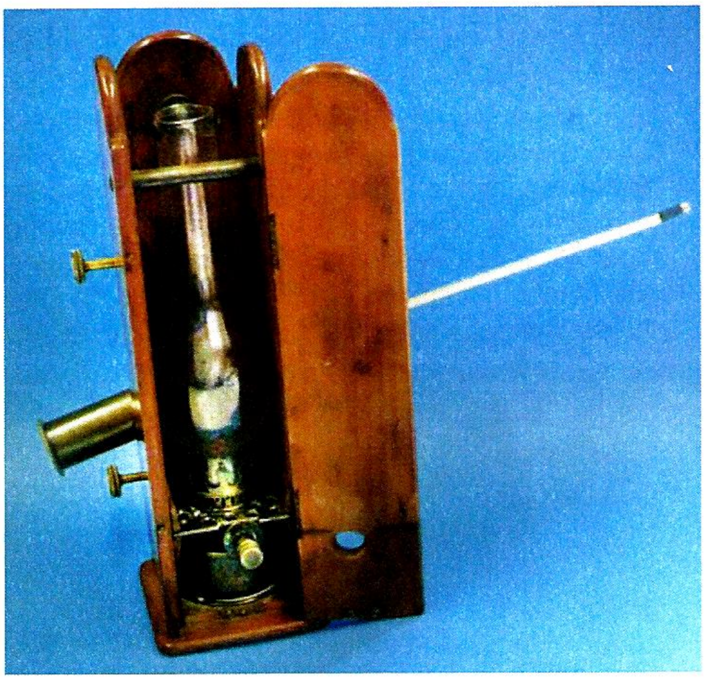


Fig. 2 The Cruise Endoscope of the Medical School Museum, Manchester showing the spirit lamp and chimney. [Author's image]

Also, a tall glass chimney helped draw and steady the flame. A mixture of burning petrol and camphor however creates a lot of heat. In order to make his instrument practical to hold Cruise encased it in a mahogany box; mahogany is a good insulator [fig 3]. Interestingly he felt his burning petrol and camphor mix was a safe option. He was however comparing it with burning magnesium wire and limelight (where a jet of oxyhydrogen ignites quicklime).

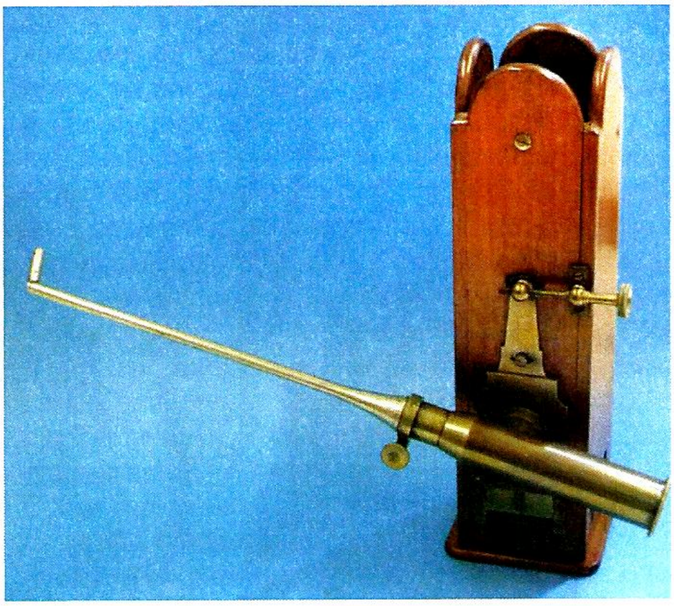
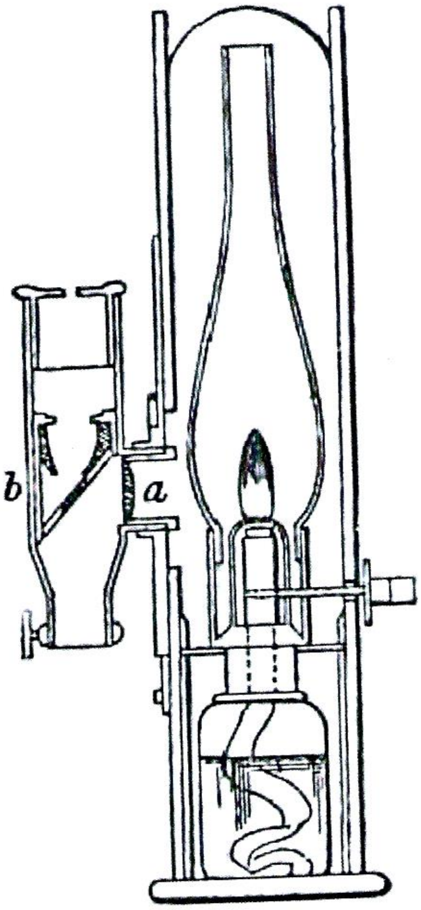


Fig.3 The Cruise Endoscope of the Medical School Museum, Manchester, showing mahogany case. [Author's Image]

Cruise next had to accurately focus his narrow beam of bright light. The height of the flame could be adjusted (as with any spirit lamp) so its edge was directly opposite a condensing lens that focussed it onto a reflecting mirror at 45 degrees [fig 4]. The lens could also be slightly adjusted up and down and forwards and backwards by the aid of brass rack and pinion and tangent screws [fig 5]. The reflecting mirror had a small hole in it to allow the user to see through it as the light was shone through the endoscope body and down the speculum into the body cavity.

To protect the user's eyes from the glare the interior of the scope was painted matt black and a perforated diaphragm (or iris) sat between the mirror and the eyepiece. For those who were long or short sighted, an extra corrective lens could be put into the eyepiece. Cruise felt that his light was not only brighter but allowed him to distinguish colours better than Desormeaux's rounder gasogene flame. He likened Desormeaux's poorer light to twilight as compared to his brighter daylight.



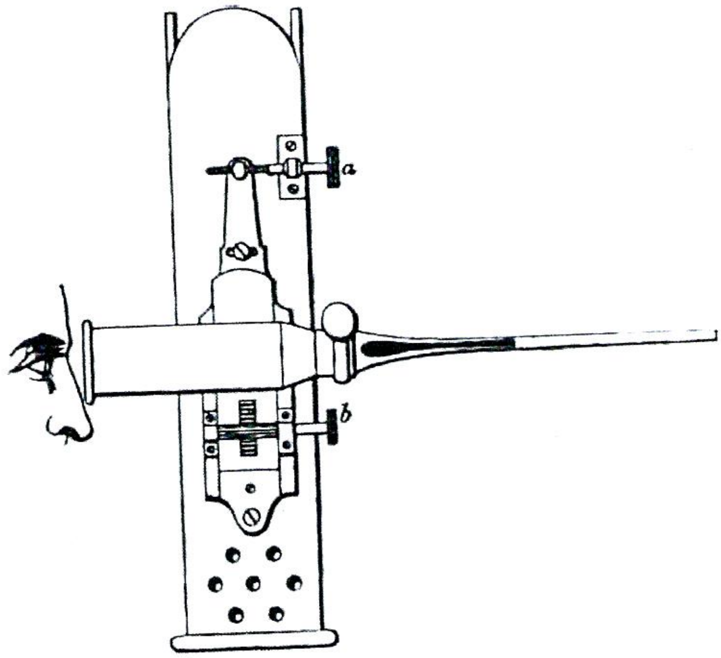


Fig 5 The Cruise Endoscope showing adjusting rack and pinion and tangent screws (a) and (b). [From: Fenwick EH. The Electric Illumination of the Bladder and Urethra as a means of Diagnosis of obscure Vesico-urethral Diseases. London: J & A Churchill; 1889]

Fig.4 The Cruise Endoscope showing condensing lens (a) and reflecting mirror (b). [From: Fenwick EH. The Electric Illumination of the Bladder and Urethra as a means of Diagnosis of obscure Vesico-urethral Diseases. London: J & A Churchill; 1889]

Use of the Cruise Endoscope

Prior to using the Cruise endoscope the interior had to be carefully blackened to prevent glare but the inside of the examining speculum must be highly polished. The fuel is topped up, the wick is trimmed and the lamp lit. The endoscope light then required careful adjustment. The flame height was raised or lowered using the small wheel on the side of the instrument. The light beam was then focussed using the two brass adjusting screws. Cruise suggested focussing the light onto a picture pinned onto the wall. The endoscope was held in the left hand up to the user's eye to look through [fig 6]. Once the light was suitable the patient was prepared. The patient is seated on an easy armchair, reclining with his buttocks resting on the edge and his knees apart. The surgeon then kneels in front of the patient and passes the greased urethral speculum (with its blind obturator in position) [fig. 7] into the urethra (as yet unattached to the endoscope). Once the tube is against the sphincter the surgeon places a greased finger into the rectum to guide it into the prostatic urethra. The obturator is withdrawn and the lit and focussed endoscope is attached.

The scope is then slowly withdrawn throughout the length of the urethra with the surgeon carefully observing the illuminated urethral mucosa as it comes into view. Thus, the technique of urethroscopy with the Cruise endoscope is an ante-

Fig.6 Author holding the Cruise Endoscope of the Medical School Museum, Manchester.

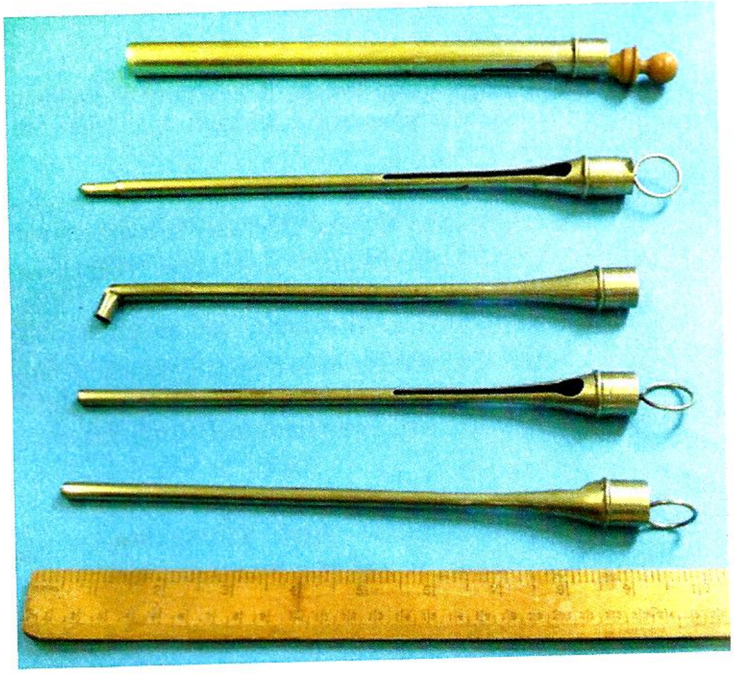


Fig.7 Cruise Endoscope speculae. Medical School Museum, Manchester, [Author's Image]

grade one. As there is no air or fluid used to distend the urethra it has to be examined as it falls into view at the end of the illuminated tube as it is slowly extracted. Occasionally, mucous or blood obscures the view. At this point a cotton swab loaded onto a probe can be passed via the slot in the side of the urethral tube to dab away the obstruction [fig 8]. Also provided is a small metal hook to retrieve any stray pieces of cotton that inadvertently fall from the probe and are left in the urethra. To clarify any uncertainty in the urethra, the scope can gently be moved backwards and forwards a little, the light adjusted up or

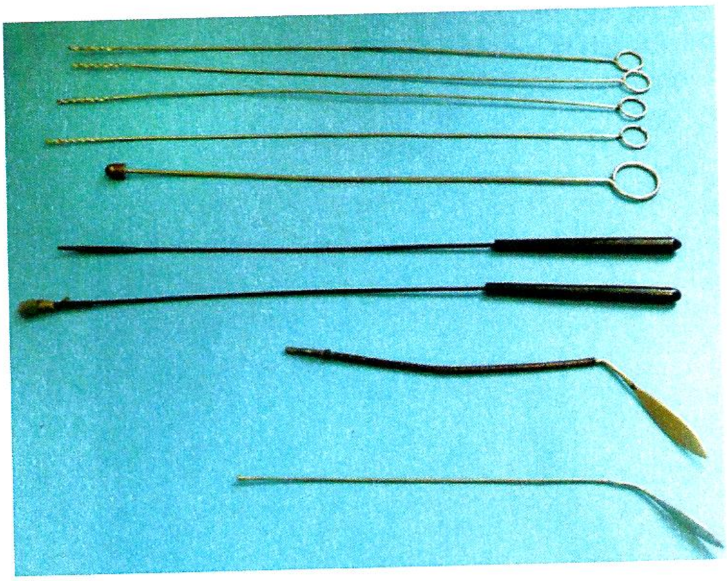


Fig.8 Cruise Endoscope instruments. Medical School Museum, Manchester, [Author's Image]

down and the finger be reinserted into the rectum to move the prostate or urethra.

Any areas of abnormality or strictures can be examined using probes [fig 8] passed down the side aperture and caustics can be applied via the same route to treat strictures. Cruise also found his endoscope helpful to allow the placement of bougies under vision to allow dilatation of strictures. Cruise also was able to carry out optical urethrotomy by passing a bistoury (knife) down the side slot and accurately cutting open the stricture. In order to carry out a cystoscopy with the Cruise endoscope the bladder had to be partially filled with clear fluid. This was introduced via double lumen catheter and irrigation continued until clear. The cystoscope attachment is a closed tube with a small glass window at the end [fig 8]. Cruise was able to see cystitis, stones, trabeculations and bladder tumours. On 4th April 1865 his friend and colleague (and former teacher) Dr Robert McDonnell set Cruise a little test. Into the bladder of a fresh cadaver (via a suprapubic incision) he placed three objects. Cruise correctly identified a brass screw, a bullet and a piece of plaster of Paris with his endoscope. He also noted that the strictest care was required to clean the scope thoroughly after use to prevent transmission of infection.

What followed

Early endoscopic light sources had been external, the light being reflected down the urethra or into the bladder. The next stage of endoscopy introduced a light source into the body cavity. Julius Bruck (1840 – 1902) a dentist of Breslau encased hot platinum wires in a glass cooling system in 1866. This light source was then famously used by Maximilian Carl-Friedrich Nitze (1848 – 1906) working with instrument maker Joseph Leiter (1830 – 1892) in the Kystoskop and Urethroskop which were introduced to the medical world of Berlin in 1877 and for clinical use in 1879. Its main disadvantage was the complex cooling system required. Desormeaux chose his old spirit lamp over electric light due to cost and the need for an assistant to carry the cooling system.

In 1878 Sir Joseph Swan, a physicist and chemist from Newcastle created a vacuum lamp that used little oxygen to ignite a carbon filament. Thomas

Edison of New Jersey also developed an incandescent lamp. Swan's technology was first applied surgically by David Newman of Glasgow in 1883 on the tip of his endoscope. It allowed him to visualise the ureteric orifices and successfully catheterise ureters in his female patients. In 1888, both Nitze and Joseph Leiter (who had by this time fallen out) incorporated the Edison incandescent bulb into the first truly usable cystoscopes. The era of modern cystoscopy dawned with the introduction of the new bulb lit cystoscopes; the Cruise Endoscope of course pre-dated these.

Conclusion

Sir Francis Richard Cruise was a famous and talented Irish doctor and Victorian Gentleman. He published articles on a wide range of subjects including dislocations and hypnotism but in urology is remembered for his early yet usable endoscope. He was knighted in 1896 and King Edward VII appointed him as his physician-in-ordinary in Ireland in 1901. Cruise also wrote non-medical works. A devout Catholic he published a biography of Thomas a Kempis and a translation of his work *On the Imitation of Christ.* In 1905 the Pope conferred on him a knighthood of St. Gregory. He was also an excellent rifle shot and musician; a proficient cellist he was made Governor of the Royal Irish Academy of Music. Francis Cruise died on February 26th 1912 and is buried in Glasnevin Cemetery in Dublin. Along with Antonin Desormeaux, Sir Francis Cruise was considered the most successful endoscopist of his time.

Author

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EDWIN HURRY FENWICK (1856-1944)
THE ORIGINS OF URORADIOLOGY

ADRIAN THOMAS

The 19th Century was a time of great technological advances in medicine. In no area was this more apparent than in the application of the new discoveries in electricity. The first successful electric cystoscope had been developed by Max Nitze (1848-1906) in 1877 and had been introduced into England by Sir Henry Thompson (1820-1904) in 1880.

Hurry Fenwick had undertaken postgraduate training in Leipzig and Berlin, and was appointed full surgeon to the London Hospital and St Peter's Hospital for the Stone. Fenwick was an early adopter of the newly invented electric cystoscope and following the discovery of X-rays in 1895 by Wilhelm Conrad Röntgen (1845-1923) was also an enthusiastic supporter of this 'New Photography'. Fenwick became a master of clinico-radiological-pathological correlation, combining data from his history and clinical examination, radiographic and operative results, and the pathology. His skill is illustrated in this blackboard diagram of radiographic findings (fig 1) and remarkably he was teaching operative cystoscopy using a bladder phantom before 1900 (fig 2).

Traditionally, uroradiological techniques were used to confirm a clinical diagnosis and since the technique was often quite invasive it was only applied when there was a reasonable chance of the examination being positive. So for example, in 1895 Howard Kelly would diagnose a ureteric calculus at cystoscopy. A ureteric bougie with wax on its tip was passed up the ureter. If the wax was scratched when removed this was evidence

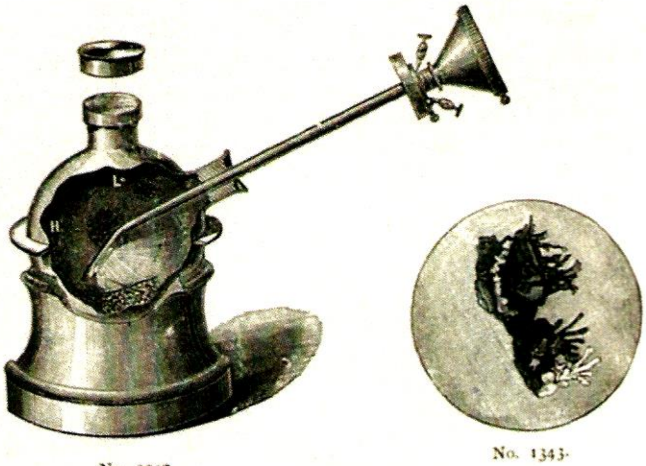

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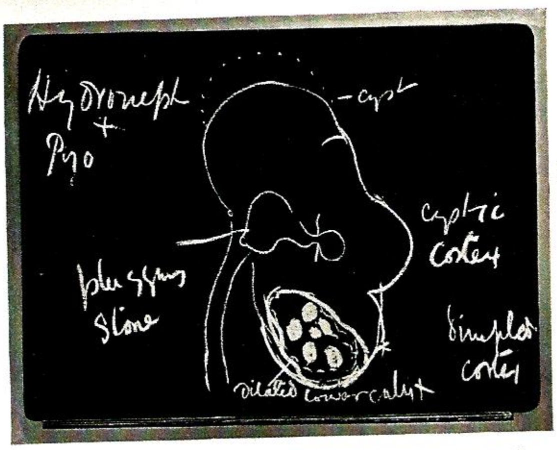
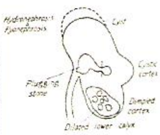
Fig.2 Cystoscopic phantom used by Hurry Fenwick from the Electro-Medical Instruments Catalogue of K Schall (1899).

of the presence of a stone. This was not a technique to be undertaken lightly, nor was it particularly accurate.

A number of workers had undertaken radiography with an opacified ureteric catheter in situ. The lumen was filled with radiopaque material such as fuse wire or a lead mandrin. It was in 1905 that Fenwick described his 'radiographic bougie' where he opacified the wall itself with iron oxide. A radiograph was made, and the position of an opacity in relation to the ureter could be determined with confidence and a phlebolith distinguished from a ureteric calculus (fig 3). Hurry Fenwick commented on the distressing situation with the failure of operative surgery when a kidney was opened and damaged to remove a stone when it was no longer in the kidney and was now in the ureter. Hurry Fenwick estimated that this happened in about 30% of cases when the 'X-ray expert' was not called upon to help in the diagnosis. The 'X-ray expert' (radiologist) can 'guide the urinary surgeon (urologist) with a precision unattainable before the introduction of the (X-ray) method is without cavil.' Hurry Fenwick

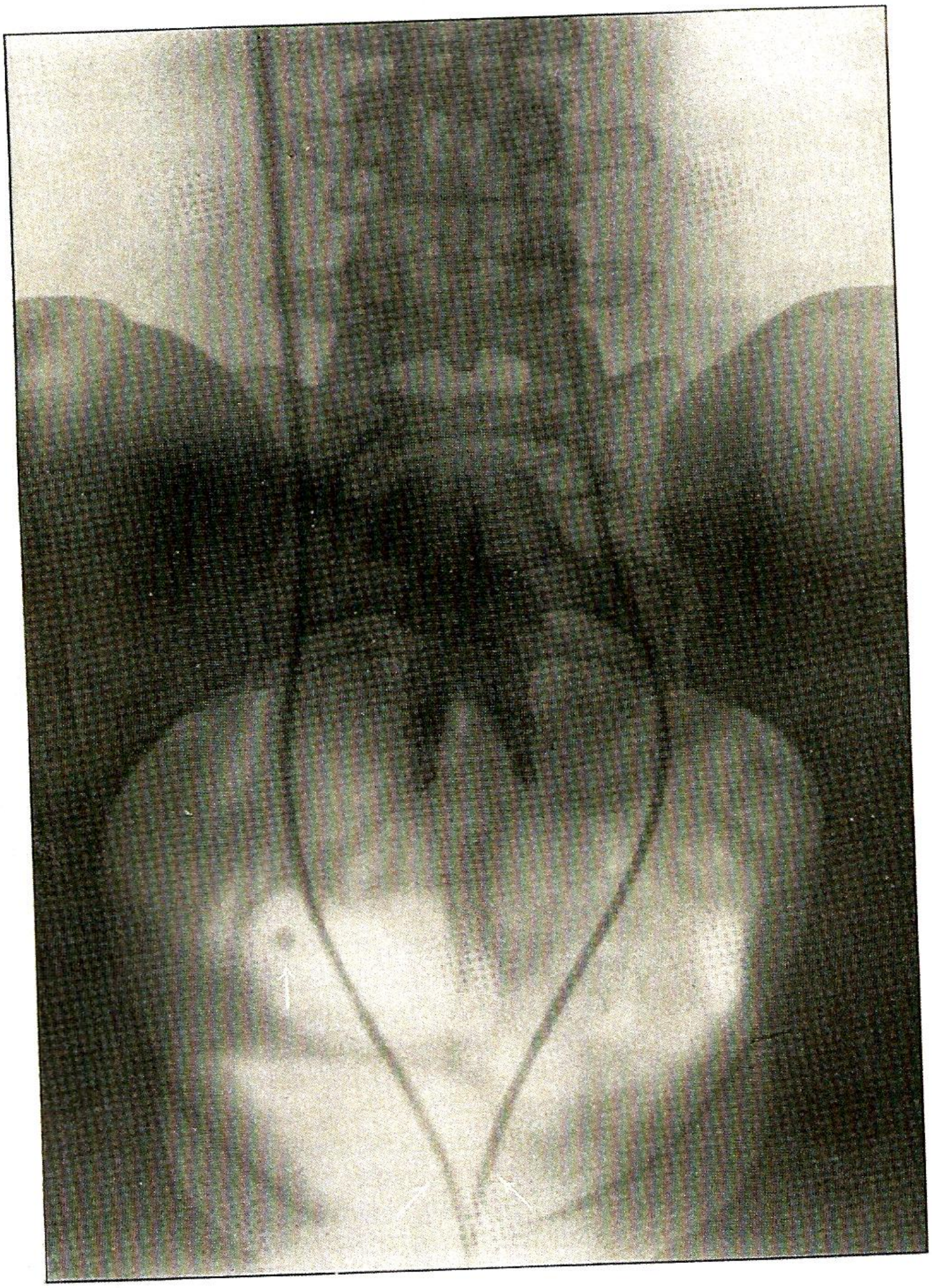
PLATE XXVIII.





Blackboard diagram, drawn before operation, of condition of left kidney as revealed by preceding radiograph (Plate XXVII).

Fig. 1 Blackboard diagram of radiographic findings.



Phlebolith shadow (upper white arrow) outside ureteric X-ray bougie which lie in each ureter (lower double white arrows).

Fig. 3 Right sided opacity shown separate from ureter proving it is a phlebolith.

was writing in 1908 when the techniques used were still quite primitive and before the introduction of either retrograde or intravenous pyelography.

In conclusion, Hurry Fenwick was a remarkable surgeon and was a pioneer of cystoscopy and also of the use of radiography for urological abnormalities.

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CUTTING FOR STONE IN ANCIENT INDIA
EXPERIMENTAL VALIDATION OF SUŚRUTA'S PERINEAL LITHOTOMY

K.M.N. KUNZRU, T. PHILIP & V. MAHADEVA

The surgical compendium, *Suśrutasaṃhitā*, is attributed to the 1st Millenium BCE surgeon, *Suśruta*. The book describes various operative procedures, including perineal cystolithotomy, the cutting for urinary bladder stone through the perineum (behind the root of the scrotum). The book has been redacted at least thrice: at the end of the first millennium BCE by *Dṛḍhbāla* (possibly a surgeon-physician); in early first millennium CE (? 3rd C) by *Nāgārjuna* (another surgeon), and in XIIC CE by a Kashmiri physician, *Dalahana,* (who, as far as we know, did not operate). Others have also added to the text, without attribution, as discussed later.

We translated the relevant passages about the operative technique from the text (in two editions of the Compendium)(1,2), from Sanskrit to English, with the assistance of Sanskritists (Mrs. Isabelle Glover was the principal translator), and experimentally reproduced the operation of perineal cystolithotomy, per our translation of the procedure, on two male cadavers. After stone extraction we dissected the perineum to demonstrate the wound track to the bladder, and the surgical anatomy of the intervening structures. We did translate the details of perioperative care and the management of complications, but have not discussed these here since they were not part of the experiment.

The operation followed the description in *Suśrutasaṃhitā, Book IV* and *Cikitsāsthanā, Ch. XVII.* The suitably prepared patient is placed supine, with the shoulders and upper trunk resting on the seated assistant's lap. The buttocks rest on a wooden plank with a folded cloth under them to elevate and present the perineum to the surgeon. The hips and knees are flexed and they and the ankles are tied to the bent elbows of the patient, trussing him up in the so-called lithotomy position. The abdomen, with full bladder, is massaged below the umbilicus to the left by the assistant, who pushes downwards with the fist to make the stone descend to the base of the bladder. The surgeon inserts the lubricated index and middle fingers of the non-dominant hand (nails pared) into the rectum, and feels the stone, which has been pushed down by the assistant's manoeuvre. The surgeon hooks his fingers above the palpable stone and pulls it down to the perineum, to bulge behind the root of the scrotum, in front of the anus. The surgeon next makes an incision over the bulge, a "barley corn's width" (about 3-4mm.) away from the midline perineal raphe (*Sīvanī*) displaying the stone. The incision should be of sufficient size to enable the stone to be removed intact as fragments left behind lead to recurrence. The stone is eased out in one piece using an instrument, an *agravkra, i.e.* "curved at the front end" (wrongly translated as a 'hook', which we did not find suitable). An added sentence (in a different style and vocabulary) says that 'in a woman the uterus is in the way, so the cut should be a little higher and forward, but not through the vagina because that would result in an unhealed urine discharging wound (?vesico-vaginal fistula)'. This strange addition, anatomically not feasible, is discussed below.

The operation was reproduced in two male cadavers, by a right handed and a left handed surgeon. The dome of the bladder was exposed through a small suprapubic approach and a small incision

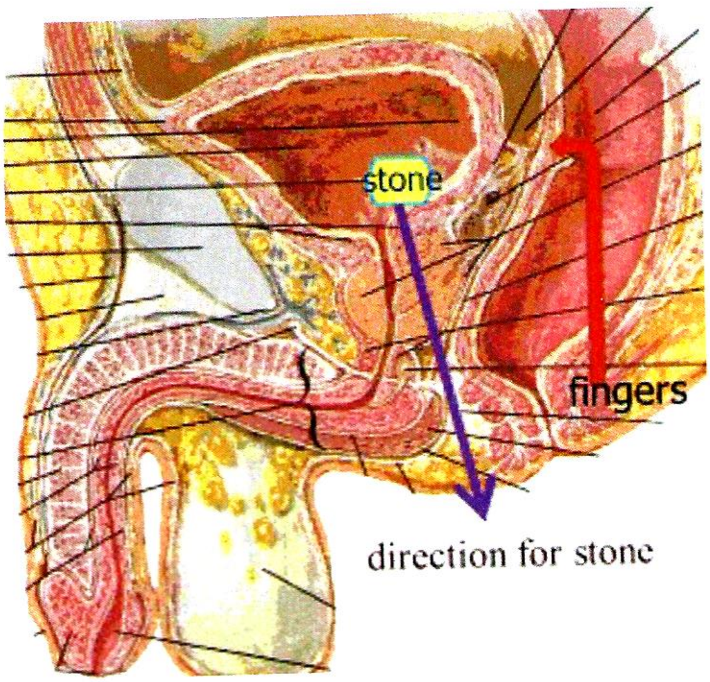

Fig. 1 Anatomy of the region

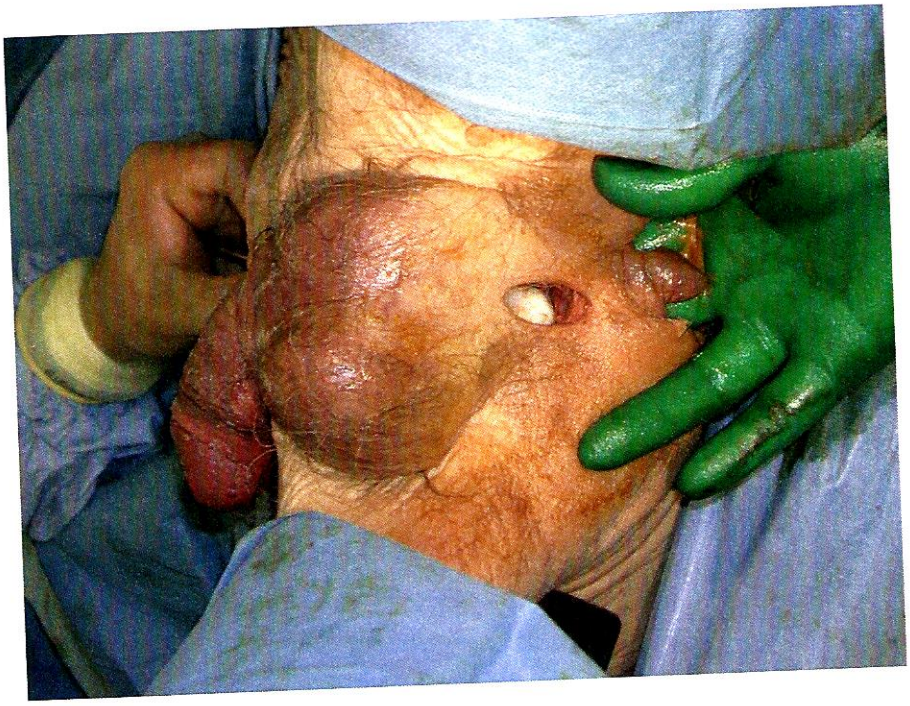

Fig.2 Cadaveric dissection

made in the bladder to introduce a stone and a Foley's catheter, the opening then sealed-off with a purse string suture. The bladder was distended with fluid. The operation was performed, as described (Figs.1&2), and took just a few minutes, including the photography. A Macdonald's dissector easily delivered the stone from the wound. Neither a blunt nor a sharp hook worked (Fig.3).

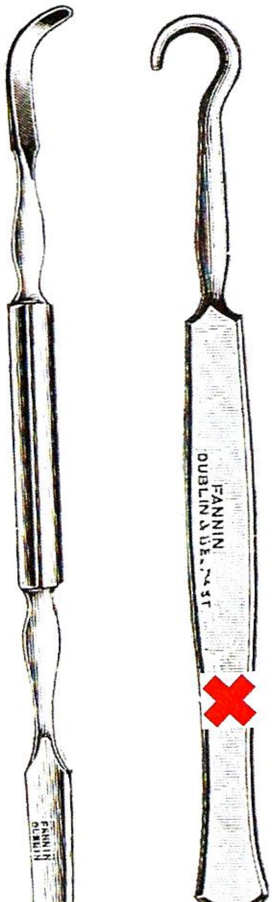

Fig.3 on the left a Macdonald dissector, on the right a surgical hook

After the operation the perineum was dissected, in layers right down to the bladder, to examine the wound track, and the structures cut, or exposed. Below the skin and subcutaneous fat the wound track went through the posterior fibres of the superficial perineal membrane (Colles's fascia), some fibres of the transverse perineal muscles, and **between** the ischio-cavernosus and bulbo-spongiosus muscle, sparing both. A transverse branch of the perineal vessels was found undamaged, but close to the wound track in both cadavers, making the vessels vulnerable. The wound track went next through the deep perineal fascia (Gallaudet's Membrane) and the pelvic floor, anterior and lateral to the neuro-vascular bundle, and the seminal vesicles at the base of the bladder, and **outside** the prostate and internal sphincter. It entered the bladder antero-lateral to the trigone (Fig.4), thus, all important structures were spared.

We are surprised that all the three translators, Sharma[1] , Singhal[2] , and Valiathan[3] have accepted unquestioningly the term, *agravkra,* to mean a 'hook'. Elsewhere in the compendium a hook is named as *badiśa.* It did not prove possible to remove the stone with a blunt hook, which slips off, or a sharp hook, which risks the stone breaking up. *Agravkra* means 'curved at the front end'. A Macdonald's dissector fits the bill, as we mentioned above in description of our 'operation'. The proximity of small transverse branches of the perineal vessels to the wound track makes them liable to injury at times resulting in post-operative bleeding. The complication is recognised in the Compendium with appropriate management described.

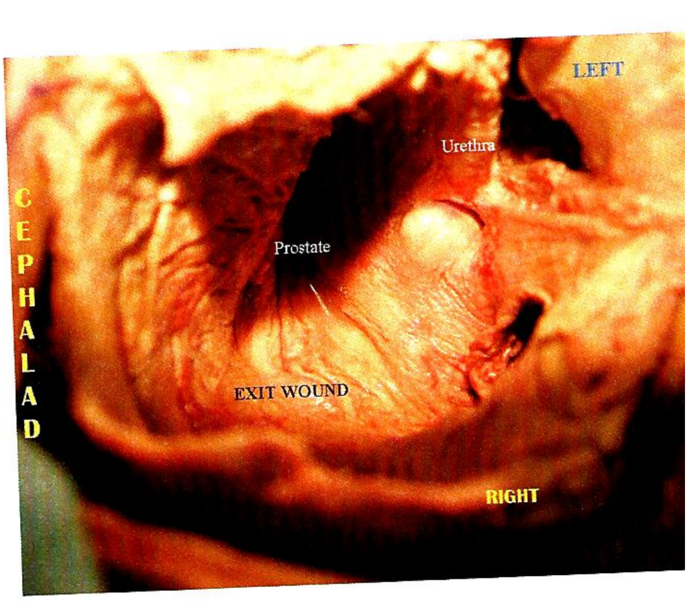

Fig. 4 Further view of dissection

The last added passage, which refers to stone removal in a female, is in a different style and vocabulary from the rest. It describes an operation in women, who do not retain stones in the urinary bladder. None of the three authors of this paper have encountered urinary bladder stones in females. The anatomy of the short and straight female urethra allows small stones to pass out easily, preventing them from being retained and growing. Two of us (KMNK and VM) have also practised general surgery in India, where we removed several bladder stones by the suprapubic route, but always in males, some as young as six. The described procedure of the 'stone removal in a woman' is anatomically not possible. The stone, if it ever exists, can only be manipulated by the fingers in the vagina, which this additional author does not state. Furthermore, the stone can only be removed by entering the bladder through the vagina, strictly prohibited by this author (Fig.5)! It seems that this person had never operated on a bladder stone, and had little clinical knowledge of stone incidence and pathology.

We conclude that the removal of urinary bladder stones, as described in *Suśruta*'s Compendium, is a practical procedure, easily performed, and with little risk to vital structures. The instrument used to deliver the stone from the wound is more like a Macdonald's dissector, not a hook.

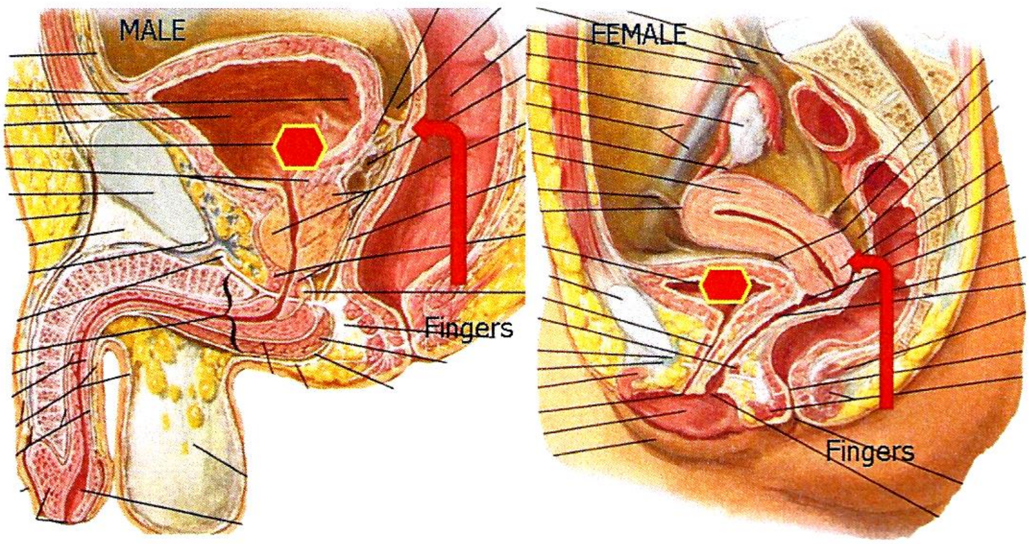

Fig. 5 Male and female anatomy compared

The added passage by a different author, shows a lack of knowledge of the pathophysiology of bladder stones in women, and a limited anatomical knowledge of the female perineum.

Acknowledgements

Our grateful thanks to the following: the two donors for generous donation of the cadavers. The Royal College of Surgeons of England for granting its facilities for this experiment. Mrs. Isabelle Glover (and another Sanskritist) for help in translation.

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BRACHYTHERAPY EQUIPMENT

DAVID RADSTONE

Fig.1 Patients applying radium applicators (1905)

Brachytherapy (Greek βραχύς brachys, meaning "near or close") means the insertion of radioactive sources directly into the affected tissues, as opposed to external beam radiotherapy. Henri Danlos (1844-1912) in 1901 treated a boy for lupus with a rubber capsule loaded with Radium. This was only a few years after Becquerel described radioactivity in 1896.

By 1903 radium surface moulds were being used to treat skin cancer. Figure 1, a photograph from 1905 shows patients in Melbourne applying radium applicators to their cancers. This nicely reduced the exposure to the doctors and nurses but not to their fellow sufferers. Because these applicators were contaminated with radioactivity no
are on public display. Figure 2 shows the mod
equivalent remote after-loading applicators
comparison.

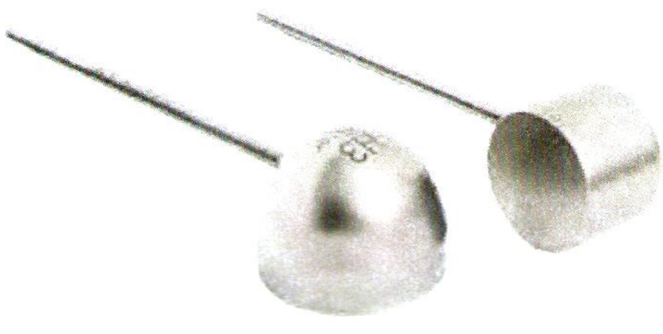


Fig.2 Modern applicators

The most common use of brachytherapy no
days is in gynaecological malignancy. This
first suggested as a treatment for carcinoma of
cervix in 1903 by Alexander Graham Bell
first employed by Margaret Cleaves the s
year. Radium was prepared in tubes to insert i

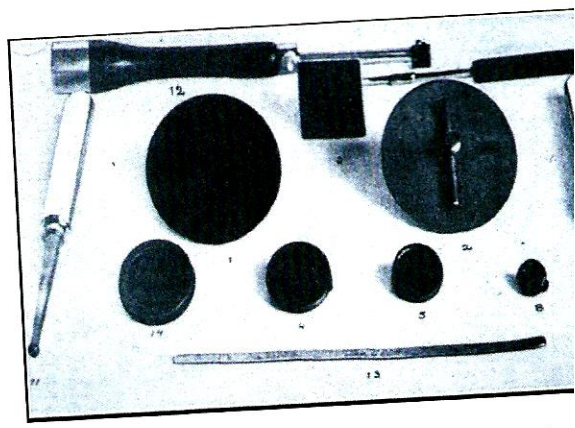


Fig.3 Tubes loaded with radium for insertion cavities

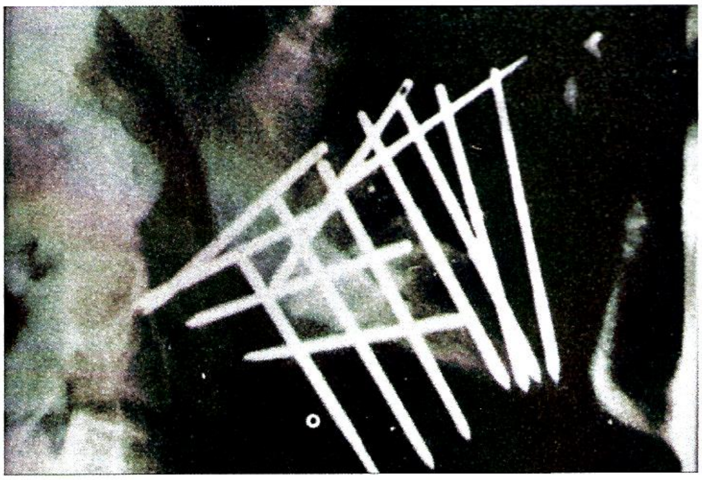


Fig.4 Radium needles for implantation

cavities or needles to implant into the tissues in planned arrangements (fig. 3&4).
The problems of protection and storage associated with Radium became apparent. Limiting the time and increasing the distance over which the operator was exposed to the 'radium bomb' (1934) had to be balanced against precision in application (fig. 5).
Surgical instruments were also adapted to facilitate the quick but accurate placement of the

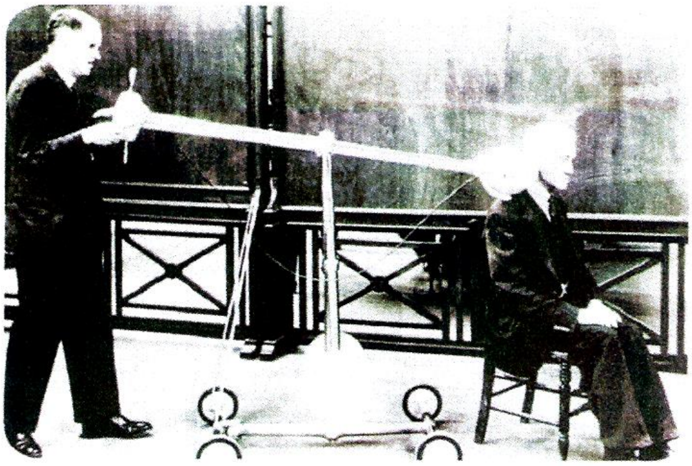


Fig.5 Remote radium bomb (1934)

sources (fig. 6). To limit exposure to the staff "after-loading" tubes could be leisurely placed and the active sources added later, initially manually and nowadays remotely. Modern-day after-loading brachytherapy instrument have to be sterilisable and MRI tolerant (fig. 7).

Brachytherapy has undergone a renaissance over the last 10 years; the use of three-dimensional image reconstruction and it use in treating prostate cancer are important recent advances (fig. 8).

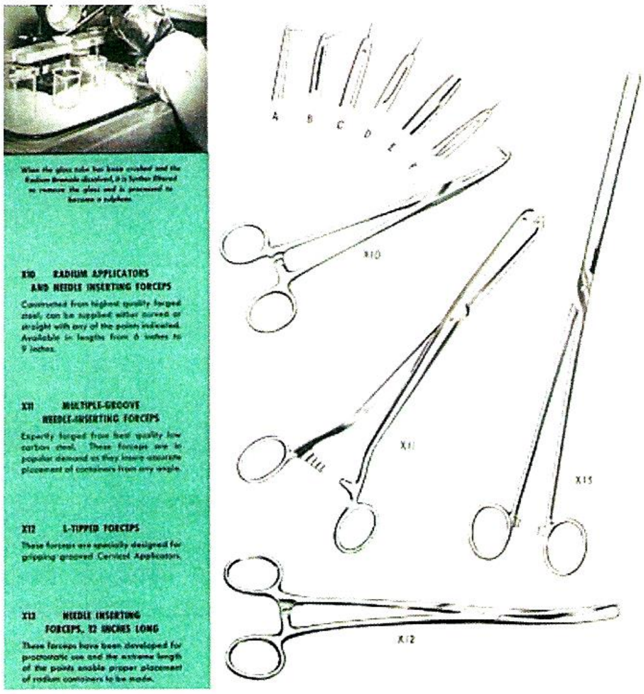


Fig. 6 X-ray & Radium Industries (Toronto) Catalogue (1950)

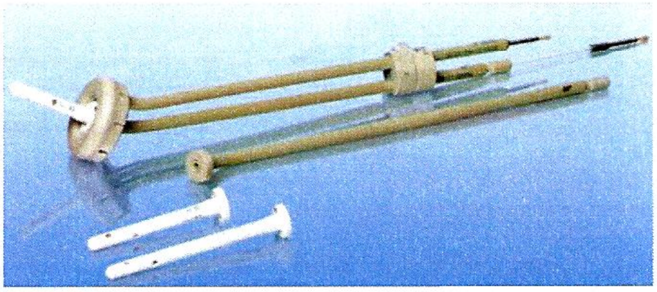


Fig.7 Modern gynaecological brachytherapy instruments

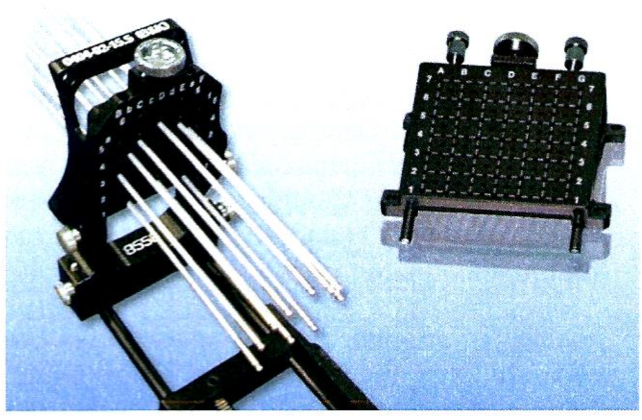


Fig. 8 Modern remote after-load equipment for prostate cancer

THE ROYAL HUMANE SOCIETY APPARATUS FOR THE RECOVERY OF PERSONS APPARENTLY DEAD BY SUFFICATION OR DROWNING

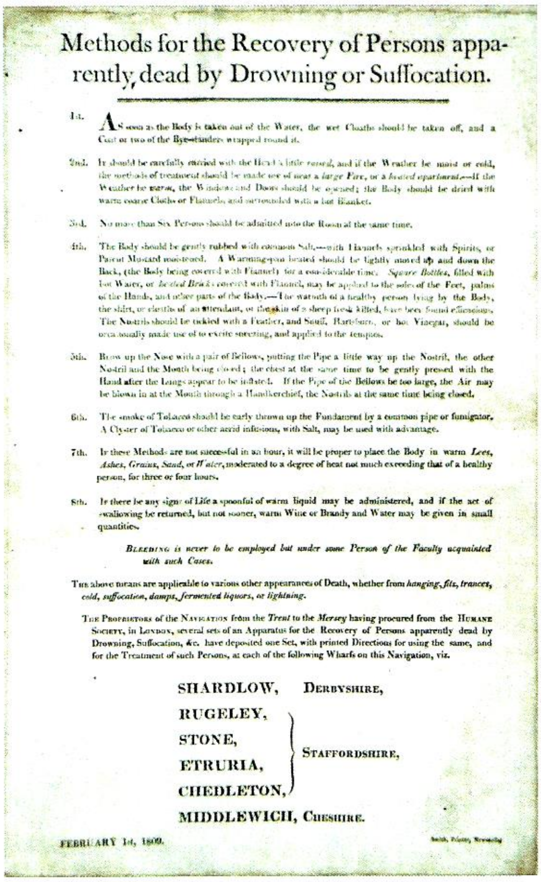
ADRIAN PADFIELD

A short prehistory of the Royal Humane Society: At the Second International Symposium on the History of Anaesthesia (London 1987)[1] Dr David Wilkinson gave a paper about the development of resuscitation in the UK. This started with the experiments of Robert Hooke, secretary of the Royal Society, who used bellows to ventilate animals' lungs via a tracheostomy in 1667. He noted that without ventilation the heart would stop but restarted when ventilation was resumed. No one in the medical profession took up the idea but in 1745 the eminent Quaker physician Dr John Fothergill (1712-80) published a pamphlet and spoke at the Royal Society. He referred to Dr William Tossach (1700-71) a Scottish doctor who, in 1732, used mouth to mouth ventilation to resuscitate a coal miner overcome by fumes. Tossach had published his account in Medical Essays and Observations in 1744.[2]

In 1773, Dr Alexander Johnson (1716-99) reported that a society in the United Provinces (Netherlands) had been set up in 1767 to revive people who fell into canals and had apparently drowned. He suggested that a similar organisation should be started in Britain and he entitled it *The General Institution.* Dr Thomas Cogan (1736-1818) made a better translation of the Dutch Society's '*Memoirs*' (1767 to 1773) and after meeting Dr William Hawes (1736-1808) they formed '*An Institution for affording immediate relief to persons apparently drowned*' in 1774. It then became *The Society for the Recovery of Persons apparently Drowned*, and in 1776; '*The Humane Society*'. My interest in canals led me to discover that the Humane Society apparatus was provided at warehouses on the Trent & Mersey canal. Generally speaking the RHS did not regard artificial ventilation as the primary method of attempting resuscitation. Warming and applying friction to the body were regarded as most important and blowing tobacco smoke into the rectum was regarded as a useful stimulant: it was thought the drowned or suffocated were only apparently dead or in suspended animation.

Copies of original '*Reports of the Royal Humane Society*' are in the London Metropolitan Archives with details of successful rescues but usually only lists of the failures. From May 1775 the Reports mention Humane Societies set up around the country and include several Navigations (Canal companies) and rivers. In 1785, George III granted royal patronage and in 1787 it became the Royal Humane Society. Based in London, the Society's first reports of rescues were from the Thames but soon published other rescues from around the country and abroad. Philanthropic members of the rising middle class became subscribers from a guinea (£1.05) upwards, as did the aristocracy who usually paid more. Local surgeons were listed as Medical Assistants for Receiving Stations on rivers and canals. Apart from commissioning apparatus, the Society's income was used to offer rewards from 2/6 (12.5p) to 4 guineas (£4.20: equal to £300 today perhaps?). Canny Cockneys soon realised there was money to be made and conditions for payments became more rigorous and later medals only were awarded. In 1795 the Society published a volume of transactions, recording its activities from foundation to 1794. Up to then 2,572 cases had been investigated; 959 restored to life by Medical assistants, lives preserved by use of the Society's apparatus – 876, and unsuccessful cases: 747 (perhaps an under-estimate?).

Fig.1 The Bedford Museum set



Methods for the Recovery of Persons apparently dead by Drowning or Suffocation.

1st. AS soon as the Body is taken out of the Water, the wet Cloaths should be taken off, and a Coat or two of the Bye-standers wrapped round it.

2nd. It should be carefully carried with the Head a little *raised*, and if the Weather be moist or cold, the methods of treatment should be made use of near a *large Fire*, or a *heated apartment*.—If the Weather be *warm*, the Windows and Doors should be opened; the Body should be dried with warm coarse Cloths or Flannels, and surrounded with a hot Blanket.

3rd. No more than Six Persons should be admitted into the Room at the same time.

4th. The Body should be gently rubbed with common Salt,—with Flannels sprinkled with Spirits, or Patent Mustard moistened. A Warming-pan heated should be lightly moved up and down the Back, (the Body being covered with Flannel) for a considerable time. *Square Bottles*, filled with hot Water, or *heated Bricks* covered with Flannel, may be applied to the soles of the Feet, palms of the Hands, and other parts of the Body.—The warmth of a healthy person lying by the Body, the shirt, or cloths of an attendant, or the skin of a sheep fresh killed, have been found efficacious. The Nostrils should be tickled with a Feather, and Snuff, Hartshorn, or hot Vinegar, should be occasionally made use of to excite sneezing, and applied to the temples.

5th. Blow up the Nose with a pair of Bellows, putting the Pipe a little way up the Nostril, the other Nostril and the Mouth being closed; the chest at the same time to be gently pressed with the Hand after the Lungs appear to be inflated. If the Pipe of the Bellows be too large, the Air may be blown in at the Mouth through a Handkerchief, the Nostrils at the same time being closed.

6th. The smoke of Tobacco should be early thrown up the Fundament by a common pipe or fumigator. A Clyster of Tobacco or other acrid infusions, with Salt, may be used with advantage.

7th. If these Methods are not successful in an hour, it will be proper to place the Body in warm *Lees, Ashes, Grains, Sand, or Water*, moderated to a degree of heat not much exceeding that of a healthy person, for three or four hours.

8th. If there be any sign of Life a spoonful of warm liquid may be administered, and if the act of swallowing be returned, but not sooner, warm Wine or Brandy and Water may be given in small quantities.

BLEEDING is never to be employed but under some Person of the Faculty acquainted with such Cases.

THE above means are applicable to various other appearances of Death, whether from *hanging, fits, trances, cold, suffocation, damps, fermented liquors, or lightning.*

THE PROPRIETORS of the NAVIGATION from the *Trent* to the *Mersey* having procured from the HUMANE SOCIETY, in LONDON, several sets of an Apparatus for the Recovery of Persons apparently dead by Drowning, Suffocation, &c. have deposited one Set, with printed Directions for using the same, and for the Treatment of such Persons, at each of the following Wharfs on this Navigation, viz.

SHARDLOW, DERBYSHIRE,
RUGELEY,
STONE,
ETRURIA, } STAFFORDSHIRE,
CHEDLETON,
MIDDLEWICH, CHESHIRE.

FEBRUARY 1st, 1809.

Fig.2 Notice from the Trent and Mersey Navigation

A well preserved example [Fig.1] is in the Bedford Museum of RHS apparatus with bellows, cannulae, tobacco box and bottles of medications, probably used for people who'd fallen into the nearby Great Ouse. It is dated by a plaque on the lid: 1807. The Science Museum has several examples of RHS apparatus; on their website they are all dated 1774; perhaps a blanket figure relating to the date of the original foundation of the RHS. An 1809 notice from the Trent & Mersey Navigation [Fig.2] has eight instructions for the recovery of the apparently dead and also the names of the wharves where the apparatuses are kept. Mouth to mouth respiration is the 5th but it was deleted in 1812, the resuscitator's breath was regarded as impure; perhaps also because of indelicacy and foul mouths. The idea (6th) of rectal insufflation of tobacco smoke and insertion of a tobacco clyster or enema was based on the 17 & 18th century theory of 'sympathy'.

A set [Fig.3] from the Bath Royal Literary and Scientific Institution and with both bellows and a rubber bulb but no tobacco box implying that it was after 1811 when the dangers of tobacco were recognised and its use was forbidden in 1811 and deleted from the Instructions. Thomas Cogan one of the original founders of the RHS retired to Bath and founded the Bath Humane Society. It was recorded in the RHS Reports as meeting on 20th June 1805 but this probably wasn't the first meeting; the RHS had reported that on 16th July 1778 two people were resuscitated after falling into the River Avon in Bath. Another resuscitation set [Fig.4] in the Science Museum is more compact and has just a rubber bulb which was used for introducing fluids into the oesophagus.

Fig.3 The Bath set

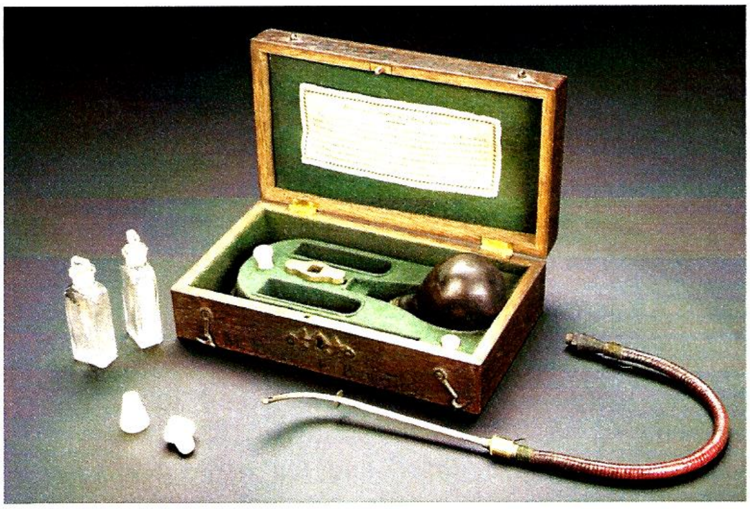


Fig.4 The Science Museum set

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THE MEDICAL ASPECTS & LEGACY OF THE BATTLE OF WATERLOO

MICHAEL CRUMPLIN

The reputation and performance of the British Army and the Army Medical Department (AMD - the forerunner of the RAMC -1898) had grown significantly during the Peninsular

Fig.1 Sir James McGrigor [courtesy of the Aberdeen Medico-Chirurgical Society]

War (1808-14), with contributions from medical giants such as James McGrigor (1771-1858) (fig.1), George Guthrie (1785-1856) and John Hennen (1779-1828). By the spring of 1814, the Peninsular War had ended and the exhausted soldiers and medical men returned home. McGrigor had formed a strong symbiotic bond with the Duke of Wellington and was promoted Director General of the Army Medical Department just four days before Waterloo. But the war was not ended and the Corsican ogre - the Emperor Napoleon Bonaparte (1769-1821) - unexpectedly returned to France on 1 March, 1815. His reign had started (1804) with a commendably efficient Service de Santé, but by 1812 had become weighed down with bureaucracy, parsimony and attrition of its staff. Many French surgeons were lost in Spain and Russia.

The '100 days' Campaign of Waterloo consisted of four battles, culminating in the Battle of Waterloo itself. On this occasion - 18 June 1815 - the Duke of Wellington (1769-1852) placed his troops well and fought a defensive action against robust French infantry, artillery and cavalry assaults (fig.2). Our allies, the Prussians, led by the indomitable Field Marshal Blücher (1742-1819), fought bitterly against the French during this campaign and usually no quarter was given by either side.

Whilst Napoleon had taken a huge gamble against overwhelming forces, Wellington had an 'infamous' and polyglot army to lead. Around half his troops were inexperienced and he had with him less than 50% of his medical staff who had fought in the Peninsula. Limbs were avulsed by round shot but the majority of injuries presenting to surgeons (>60%), were inflicted by small arms. Sabre slashes and penetrating wound with the long French lances mostly fell around the head and neck and torso respectively.

The AMD represented at Waterloo consisted of hospital medical staff (52 initially, but eventually around 110) and approximately 200 regimental surgeons. The battalion surgeon would stay back in relative safety, receiving casualties, whilst the most senior of two assistant battalion surgeons stayed with the colours, meting out

Fig. 2 Intrepid cavalry advances against robust Allied infantry squares (courtesy of the panorama, Waterloo, Belgium)

Fig.3 Casualties being received at Mont St Jean Farm, Waterloo (author's image)

dressings, giving water, controlling haemorrhage and prognosticating over survival. There was little cover for the casualties and their treatment on the open rolling Brabant landscape. It would seem that most of the Allied wounded (c.6,000) were treated in the large farm of Mont St Jean, where regimental, divisional and staff surgeons toiled incessantly for 2-3 days (fig.3). Around 75% of injuries were of limbs, twice as many suffered on the lower rather than the arms. Roughly 2,000 amputations, mostly of the 'guillotine' type were carried out over the four days, about 500 in the British Army on the day of Waterloo. Lord Uxbridge, commanding the Allied cavalry had a 'flap' amputation and survived (albeit with a 'phantom limb and causalgia'!), whilst the great personal friend of the Duke, Colonel Alexander Gordon, bled to death after a mistimed guillotine procedure. Fitzroy Somerset, later the Lord Raglan of Crimean fame, had an uneventful above elbow amputation (fig.4).

Bullet wounds were probed, wounds were explored for debris and fractures were 'set' using very short and useless splinting techniques. There were a few craniotomies, the most notable being Lieutenant Purefoy Lockwood of the 2/30th Regiment. He wore a silver plate inscribed with the words, 'Bomb Proof' on the surface. Trephining had been rather liberally used in the mid to late 18th century, but by the time of this battle was employed in a rather more circumspect manner. By 1816, the war was over and 74% of casualties had re-joined their units. The long Republican and Napoleonic wars had claimed proportionally more victims than the 1914-18 cataclysm. Some seeds had been sewn for the beginnings of modern military medicine.

Fig.4 Set of imperial Guard capital (amputation) instruments abandoned on the field of Waterloo (Courtesy of Musée de l'Hôpital Marie à la Rose, Lessines, Belgium)

CATHETERS, BOUGIES, SOUNDS & DILATORS: SIZE MATTERS

PETER & JULIE MOHR

The urologist's armamentarium is formidable. Catalogues of surgical instruments contain a bewildering array of instruments designed to drain the bladder, probe for stones and bypass strictures – all via the urethra. This paper reviews their history and uses instruments from the Beswick Collection of the University of Manchester Medical School Museum as examples.

Catheters[1]

Urinary catheters made from organic or man-made materials (fig.1) have been in use to relieve urinary retention since ancient times; bronze

Fig.1 Box set of 19th century silver-plated catheters, Woolley's & Sons. Manchester Medical School.

catheters were used by the Romans and curved silver tubes were used by surgeon Ambroise Paré (1510-90). The later use of gum elastic catheters allowed some flexibility and were used by John Hunter (1728-93) for difficult catheterisations. The coudé and bicoudé distal angled ends were designed by Louise Mercier (1812-82) to ease the tip past an enlarged prostate. Fully flexible catheters made from red rubber tubing were introduced by French surgeon Auguste Nélaton (1807-73) in the 1840s and were manufactured in Britain by Archie Jacques (1815-78), manager of the London Rubber Company, as 'Jacques Catheters'. The discovery of artificial latex rubber in the 1930s and the increasing range of plastics from the 1950s allowed the development of the modern flexible catheter in a range of sizes suitable for male and female patients. American surgeon Frederic Foley (1891-1966) invented the self-retaining balloon catheter and Liverpool urologist Normal Gibbon (1918-2008) used Perspex tubing for permanent in-dwelling catheters. Disposable catheters were first massed produced in the USA in 1955 by engineer David Sheridan (1908-2004) and paved the way for the wide range of catheters in use today including silicone and hydrophilic-coated ones used for intermittent self-catheterisation.

Bougies

A 'bougie' is a thin, long solid surgical instrument, which is used to locate and pass a urethral stricture. 'Bougie' is French for 'candle' and is derived from the Algerian port of Bougie which was famous for wax candles. The original surgical bougies were probably long flexible wax tapers then later manufactured from both gum elastic and metal. The gum elastic ones were made in

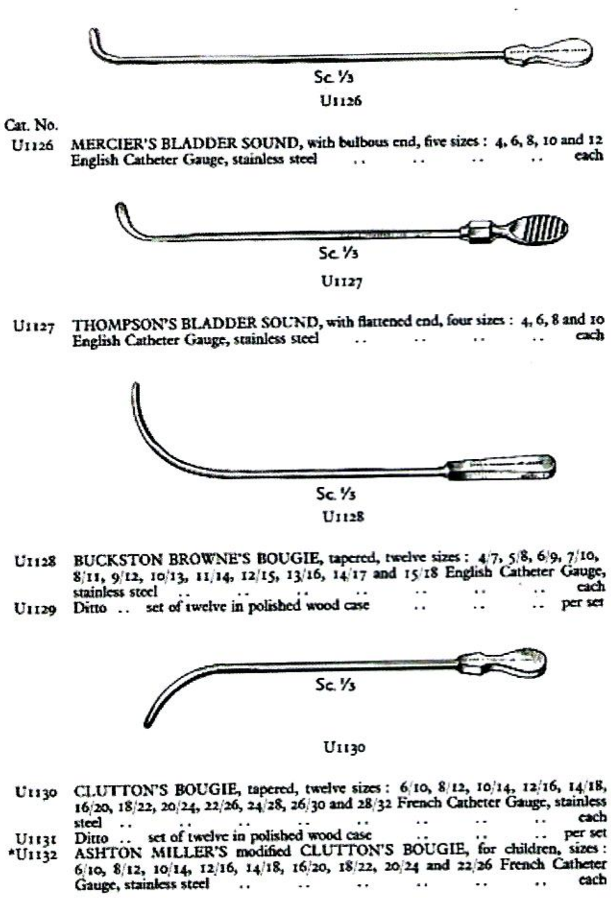

Fig.2 Bougies and sounds, Thackray Surgical Instrument Catalogue, 1956. Note the double size notations for the bougies, e.g. 26/30, indicating the tapering of the stem from proximal Fr.30 to distal Fr.26.

a range of sizes and shapes, some with tapered or bulbous tips, while very thin 'filiform' ones were used for tight strictures. Parisian surgeon Charles Phillips (1811-70) designed the 'whip bougie' – a filiform attached to a thicker tapered bougie, which guided the way and avoided making a false passage; London urologists Reginald Harrison (1837-1908) and Canny-Ryall (1865-1934) also used whip bougies for tight stenosis. Surgical instrument manufactures produced a bewildering array of eponymous metal bougies, often overlapping with 'sounds' and 'dilators' (fig.2).

Sounds

A 'sound' is a long slender metal instrument for probing the urethra and bladder to locate urinary stones, which are detected by both feeling and hearing the contact. Bladder stones occur mainly in men - Samuel Pepys famously had a large bladder stone removed in 1658, however urinary stones are now a much rarer problem. Several surgeons including Lord Lister (1827-1912) and Henry Clutton (1850-1909) had their names attached to these instruments; Lister stressed the importance of an all-metal handle to properly sound the stone. The difference between a sound and a bougie or a dilator is that the sound is slender and of uniform diameter with a shorter curved tip (fig.3) – Lister called his a 'stone seeker'.

Dilators

Once a stricture has been located it will probably need treatment. This was usually done by using bougies of increasing diameter to gradually enlarge the stenosis over a prolonged period. Clutton's metal bougies came in box sets of increasing size; they had bulbous tips and easy-to-hold 'leaf' handles; each one was also tapered from top to bottom, indicated by the size-stamp, for example Fr.'8/12' meant that thicker distal part was Fr.12 tapering to Fr.8 at the tip. Clutton's *sound* is clearly different from his graduated *bougies*. Some surgeons thought repeated dilatations could be avoided by a more acute treatment using mechanical urethral dilators to stretch or rupture the stricture. Urologist Bernard Holt (1816-94) designed a 'divulsor', a two bladed probe, which suddenly stretched the stenosis when a thick metal bougie was passed down between the blades (fig.4). Fess Otis (1825-1900), an American urologist and anatomist, invented an 'urethrometer', a two-bladed instrument controlled by a screw-gauge to measure the diameter of the normal male urethra; later he added a blade converting it to the 'Otis Urethrotome' (1885). German surgeon Arthur Kollmann (1858-1941?) invented a hefty four-bladed dilator also operated by a screw gauge.

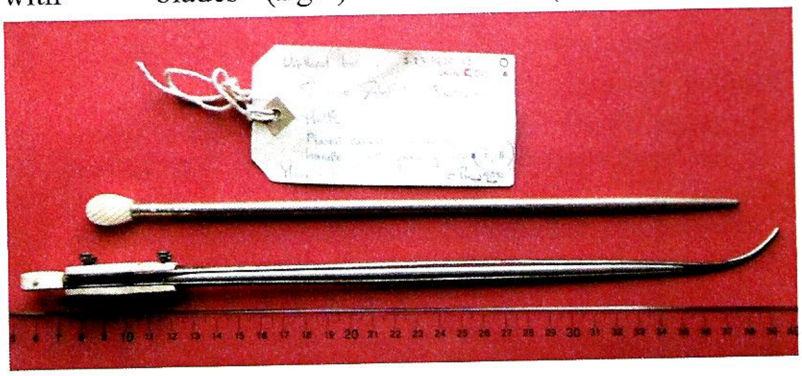

Fig. 4 Holt's divulsor urethral dilator (1863). Manchester Medical School.

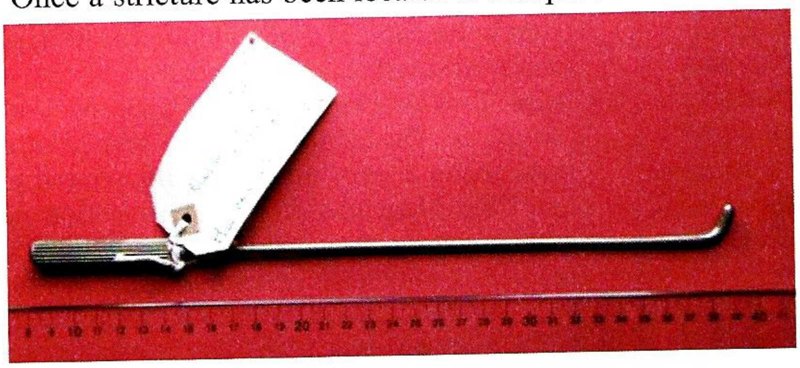

Fig.3 Clutton's sound. Note the Cylindrical handle, straight slender stem & short angle tip. Clearly different from his bougie dilators. Manchester Medical School.

Frédéric Charrière (1803-1887)

All these instruments, even in the hands of experts, carried the risk of urethral damage, especially of a false passages. Clearly the size of an instrument was critical. Charrière, the famous French instrument maker, developed his system of measurement of catheters, sounds and bougies in the 1830s as a manufacturing aid and published his catheter gauge (*filière de sonds*) in 1844. He based it on three times the external diameter in millimetres (1 Fr = 3x Dmm) so a 10mm diameter sound is French

Fig.5 Plastic catheter gauge (1950s) showing Charrière's French scale and the English gauge equivalent. Benique's gauge is on the reverse side (not shown). Manchester Medical School.

gauge Fr.30 (or Ch.30). The Charrière gauge has withstood the test of time and is used universally – other gauges such as the Plasteau-Benique (once used for ureteric catheters), the English gauge and the US gauge have fallen out of use (fig.5).

Summary
Much of urological history is focused on the stunning advances in operative endoscopy and fibre optics, nevertheless catheters, bougies a sounds still play an important part in mode urology. One can only admire the skill a courage of those early surgeons, before a modern imaging or endoscopy, who using th 'simple' instruments tackled the age old pr lems of retention, urinary stones and ureth stenosis.

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[2] BAUS Virtual Museum htt www.baus.org.uk/museum/ I am grateful to honorary curator Jonathon Goddard for in mation on the use of bougies, sounds & dilat

[3] Drulhon J, *Frédéric Charière (1803-1976), Fabricant d'Instruments de Chirurgie* (2008 Paris.

UNIVERSITY OF MANCHESTER MUSEDUM OF MEDICINE & HEALTH -- AN UPDATE

Just a note about a change of name for the old Manchester Medical School Museum. A short history of the Museum can found in the *HMES Bulletin* 13 (2005). The then dean of the Manchester Medical School, Dr FB Beswick ('Bill Beswick') and architect Harry Fairhurst (1925-2011) spent a decade designing and planning the new Stopford Medical School Building which opened in 1972-73. The entrance foyer included large display cabinets and it was always intended to include a medical history museum. A foundation collection accumulated by the Professor of Anatomy, Dr George Mitchell (1906-93) was soon added to by several donations and the dean's wife, Charlotte Beswick (1926-2013) looked after the collection and displays for over twenty years. Pharmacist Bill Jackson (a member of the HMES) took over as honorary curator until 2002 when the post was passed on to Peter & Julie Mohr. The museum provided loans, tours, displays etc. until 2011 when the University dismantled the display cabinets and the collection was subsequently stored in an old radiology room, bringing the work of the Museum to a stand-still. The good news is that the fortunes of the collection have started to improve; James Hopkins, a newly appointed University senior heritage officer, recognised the importance of the orphan medical co tion. A part-time assistant heritage off Stephanie Seville is now in charge of the co tion and a detailed report by the Wellc Trust has made several recommendations improvements. We have made the storage more accessible and re-catalogued the co tion. In addition, in 2015 Bill Beswick an daughter, Dr Jenny Jeffree, a retired anae tist, made a very generous endowment to port the Museums efforts in education of schools and other University departments plication for grants and conservation of son the objects. A small museum group has fo to implement this plan. The Museum has renamed the 'University of Manchester M um of Medicine & Health' and the collec of surgical instruments and medical equip as the 'Beswick Collection'. Items are avai for teaching, meetings or loan to other mu exhibitions. The future is looking bright!

Peter & Julie Mohr (museum volunteers

HMES BULLETIN BOOK REVIEW

An Illustrated History of Hip Joint Surgery: from Hippocrates to Charnley: John Kirkup, 2014 (London: Bone and Joint), Pp. 411+VII [paperback £25 available on-line at www.boneandjoint.org.uk/kirkup]

This well researched book is packed with information on a surprisingly wide range of topics related to hip joint surgery. In just over four hundred pages its fifteen chapters range from background and sources, pre-radiological diagnosis and treatment to the modern period through change brought about by imaging, antisepsis, asepsis, technology and material science, all of which revolutionised the treatment of children and adults suffering from hip diseases and disorders. The important chapter on total hip replacement takes the reader through the significant milestones in the evolution of this great benefit to humanity and also records the failures, due to lack of adequate information. The final chapter "Gains, Losses and Lost Opportunities" is a real tour de force - it alone would justify reading this book.

However, one must criticise the patchy reproduction of many illustrations, which reduce the value of this as an *Illustrated* History. Reduced size of the illustrations and inadequate contrast in some of the diagrams seems to be the main reason for this; the former is understandable because of constraints of space but the latter is inexplicable. One presumes this to be the fault of the publishers, very surprising, since they produce the premier *Bone and Joint* journal (and its predecessor the British edition of *Journal of Bone and Joint Surgery*).

Some examples of poorly reproduced illustrations:
Fig.2:5. Poor visualisation of the lower limbs in the lower two diagrams.
Fig3:23. "fig.2" is barely discernible without magnification.
Fig4:15. "b" the Saw can barely be seen
Fig.11:18 it is difficult to make out the faces of these founders of the International Hip Society.
Despite this obvious shortcoming I would still recommend this book. It would be of considerable use to medical historians in general, and to surgeons interested in the evolution of diagnosis and treatment of hip disorders, as an orthopaedic sub-specialty.

KMN Kunzru

WHAT IS IT? (August 2015)

Answer

1. The large amputation saw has a mobile back to prevent damage to soft tissues and is composed of a blued-steel blade, a nickel plated back,with a brass and ebony handle, made by a famous French maker 'Mathieu' circa 1875. It certainly preceded boiling by the aseptic regime introduced about 1890-2.

2. The small saw, circa 1875, is not for amputation but was designed by William Adams (1810-1900) an early orthopaedic surgeon, for osteotomy of the neck of the femur for fixed bony deformity at the hip joint. It is inscribed 'London' but no maker's name is indicated. The procedure was conducted through a tiny wound and Adams termed this a subcutaneous technique free of infection – this was not always the case but his method was adopted by others employing fully aseptic methods. They added a pistol grip handle to Adam's original straight one. Obviously the ebony handle could not withstand boiling and metal versions were made, for example by Sir Robert Jones.

WHAT IS IT? (August 2016)