John Hunter's surgical Instruments and Operative Procedures, Vesalius, 1,1, 22 - 26,1995

John Hunter's Surgical Instruments and Operative Procedures

J. Kirkup

Summary

Whereas John Hunter (1728-93) the anatomist, zoologist, physiologist, pathologist and museum collector receives unceasing eulogy, his work as a practising surgeon is curiously neglected. As far as can be determined, there are no studies devoted to his instruments and operative technique before a personal investigation in 1991, perhaps for the good reason that these would prove inconclusive. Nevertheless, the writer believes sufficient evidence is available to justify further communication.

Recorded Instruments

Few instruments authenticated in Hunter's possession remain extant; at the Royal College of Surgeons of England, five survive including four minor surgical items in a small leather case stamped «John Hunter, London» (fig. 1). The fifth, a bleeding lancet fits into an elegant tortoise-shell and silver case, engraved «John Hunter, St George's, London» (fig. 2); it has space for five other items, now mislaid. Before the destructive bombing of the College in 1941, several other instruments were displayed; fortunately photographs of these items escaped to demonstrate that Hunter possessed a needle-case with a large hand-held needle, a dressing forceps of the pivoting type with a sophisticated opening spring, a silver spatula and a pair of scissors. Other photographs figure a third case with lancets and also two instruments invented by John Hunter. Firstly, a flexible cannula and silver nitrate carrier or bougie (fig. 3) introduced by Hunter to treat urethral stricture, a subject to which we will return. And secondly, an unusual angled lithotomy knife which is illustrated in surgical instrument catalogues of the early 19th century under his name but with little information to elucidate its particular design.

Other evidence shows that contemporary British surgeons, either on foot or on horse-back, carried lancet, needle and minor instrument pocket cases on their person. In addition, provision was made for a small stock of medicines, ointments, plasters and bandages. Larger equipment such as trepanning and amputation boxes needed special transport as they were bulky and fortunately called upon infrequently.

Operative Procedures

Today we must recognise that major operations before anaesthesia were procedures of dire necessity where death was perceived by the patient as the inevitable alternative. Such occasional events were in Hunter's opinion a recognition of defeat for, haunted by their lethal complications of haemorrhage and infection, he strove to find alternative methods. Thus, his case-books suggest he performed lithotomy on only five patients during his career, of whom two died and a third was left incontinent.

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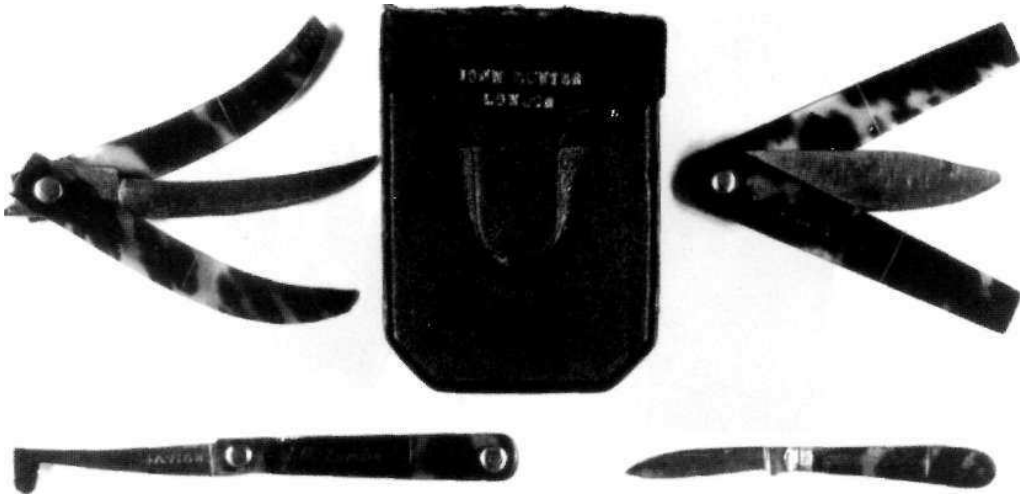
Fig. 1. Waistcoat pocket instrument case, leather, inscribed «John Hunter, London. Four folding items in steel and tortoiseshell: left, an abscess knife and gum lancet; right, a bleeding lancet and minute pocket knife.*



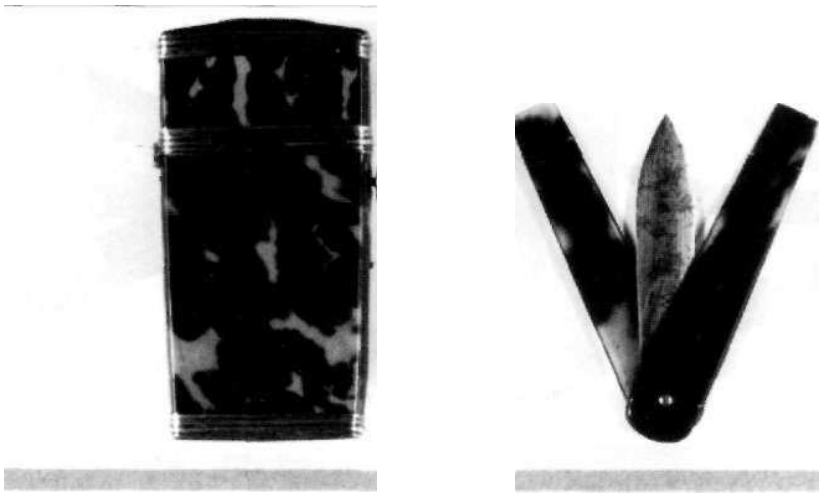
LFATHFR COVERED POCKET INSTRUMENT CASE
John Hunter . imp' gold lettering on the flap, tin case is complete and contains :-
A fleam, the tortoiseshell shields covering the blade are engraved * J.H. London' (Maker, Savigny), Two curveo knives with tortoiseshell shields marked 'J.H.London' (Maker, Savigny). A small pocket knife,
Donor. Mrs F Hut t«

For the most part, surgeons in the 18th century dressed wounds, bandaged fractures, reduced dislocations, bled, scarified and cupped for all mannerof ills, incised abscesses, extracted teeth, inoculated for smallpox, syringed for venereal disease and so on. It is plain the bleeding lancet, a seemingly minor instrument, played a major role in this work. Although strongly urged on by learned physicians, venesection was often futile and fraught with complications such as infection, secondary haemorrhage, peripheral nerve injuries and arterio-venous fistulae. Hunter possessed at least three lancet cases, probably one for personal use when ill, perhaps one for his family and certainly one or more for patients. The bleeding lancet was also employed by Army surgeons, as more soldiers died from medical conditions than wounds. This situation is highlighted when John Hunter was working with the Army in Portugal, during 1762-1763, by a requisition order which asked for two amputation boxes, two trepanning boxes, two dozen dissecting knives but twenty dozen lancets !

If Hunter's published books and his manuscript case records, transcribed by William Clift, offer fair detail of his techniques for major surgery, there is little comment on minor procedures including bleeding. Nevertheless, the case-books confirm the lancet was utilised in other fields, for example, to tap a hydrocele testis by puncture or to «dig out» an iron fragment from an eye. On other occasions Hunter employed hydrocele trocars and couching needles.

The challenge of urethral stricture formed a significant part of Hunter's practice, for venereal diseases were common and a surgical responsibility. In 1786, he published *A treatise on venereal disease* which introduced a new method of treating male urethral stricture by conveying caustic to it with an instrument of his own design (fig. 3). This consisted of a malleable silver wire cannula and a variety of bougies including a silver nitrate carrier. Careful application of this method would relieve tight strictures

Fig. 2. Lancet case, tortoiseshell and silver, inscribed «John Hunter, St. George's London». Containing six spaces, only one remains occupied by a bleeding lancet.



A TORTOISESHELL AND SILVER LANCET CASE

A silver plate on the lid is inscribed 'John Hunter, St. George's London".
it contains a fleam made by Wood (possibly of Spurrier Gate, York), the shield is engraved 'John Hunter, Surgeon'.

Donor, Mrs F Hunter

but only in the straight part of the urethra; this technique continued in use for several decades.

The capital operations of Hunter's day were limited to skull trepanning, major limb amputation, lithotomy, herniotomy, mastectomy and ligation for anevrysms. As is well known, he advanced the management of the latter by ligating the femoral artery in what became Hunter's canal, well above the aneurysm, and so simplifying the hitherto dangerous operation of ligating close to the sac. His pupils carried this further when Abernethy ligated the external iliac and Cooper both the aorta and common carotid.

Hunter recorded numerous skull injuries when he applied «the crown of the trepan», that is the hand trephine. In Continental Europe, the instrument of choice was the brace trepan whereas in Britain the simpler T-shaped trephine, promoted by John Woodall in the early 17th century, was in vogue; application of the hand trephine was said to be harder work for the surgeon but saferthan the brace. Nevertheless, Hunter's case-books indicate that he had very bad experience with many deaths after craniotomy which, in any event, was often performed too late; he concluded, when the dura was exposed severe infection was inevitable.

Limb amputation was often the treatment of choice for missile injuries but, after Hunter's military experience in Belle Isle and Portugal, he counselled a more cautious approach. He taught it was not essential to amputate or even extract bullets, being particularly impressed by five French soldiers who did not receive professional treatment for several days after wounding and yet survived to do well with conservative measures. If judged by other surgeons' comments, Hunter had insufficient experience of the severe problems posed by gunshot injuries on battlefields and in battleships.

At this time, major amputations were performed with strong heavy instruments, as

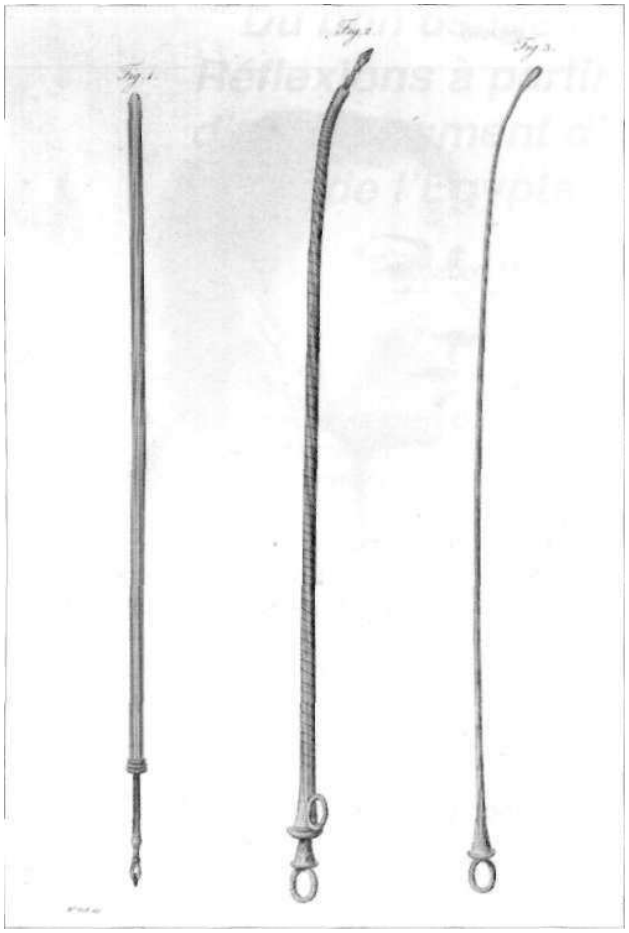


Fig. 3. Hunter's apparatus for «burning» urethral stricture : malleable silver spiral catheter with silver nitrate carrier inserted (fig.2), rigid catheter with silver nitrate carrier reversed ? (fig. 1), bougie for testing stricture (fig.3)
(Hunter, J. A Treatise on the Venereal Disease, *1786)*

movement of the patient was liable to break fine blades; this made amputation less elegant than it became later, yet not all patients moved or even cried out, as many case histories testify. Speed of operation was an objective for all surgeons - a minute or less for lithotomy and thirty seconds for an amputation. Yet, longer operations took place especially to remove large or difficult tumours. Hunter recorded a case of mastectomy for cancer which he doubted could be excised fully and thus, in his zeal to achieve a cure, worked for almost an hour. At a later date, the patient permitted him to remove a recurrence although eventually she succumbed to spreading cancer. He also undertook staged operations, as in the case of a boy of four with cataracts who was couched in both eyes twice, with many misgivings on Hunter's part. He came to the honest conclusion that «it was difficult to say whether the boy received benefit or not».

A more successful patient, with a contemporary illustration concerned John Barley, aged 37 years, with a presumed salivary gland tumour of massive and unsightly size (fig. 4a). He wrote : «The operation was performed on Monday, October 24th 1785; it lasted twenty five minutes and the man did not cry out during the whole of the operation. His symptoms afterthe operation were mild and gentle and he rapidly recovered" (fig. 4b). The specimen weighed (4.1 Kg).

Despite this John Hunter remained pessimistic about many results of operative intervention, due to mysterious factors which he discussed at length in his book *A treatise on the blood, inflammation and gun shot wounds,* published the year he died in 1793. One feels he was more at ease in his museum than in the operating theatre, and yet we can be sure he accepted his duty to intervene surgically when the patient, and their relatives, sought skilled help.

Conclusions

As a surgeon, Hunter was hostile to all authority and routine, especially in seeking rational explanations of the difficult phenomena which often frustrated operative endeavours. He has been considered a pioneer, if not the founder, of scientific surgery in applying observation and experiment to the study of surgical disease and injury. Certainly his efforts unveiled fresh horizons, introducing both novel operative procedures and instrumentation : moreover, he inspired a succession of distinguished pupils to extend these boundaries and, in their turn, to augment the surgical armamentarium and its capabilities.

• ***Fig. 4a. John Barley, aged 37 years with mixed parotid tumour, growing for 16 years.***

• ***Fig. 4b. After excision by Hunter, 24th October, 1785. (Drawn by William Bell, in John Hunter's Drawing Book)***

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Acknowledgements

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Biographical Note

John Kirkup, MA, MD, FRCS, studied at Cambridge University and St. Mary's Hospital Medical School, and he did his National Service in the Royal Navy.

Appointed Consultant Orthopaedic Surgeon to the Bath Clinical Area and the Royal National Hospital for Rheumatic Diseases in 1964, he took a special interest in rheumatoid arthritis of the foot and ankle, published papers and chapters in this field and devised the successful Bath ankle joint prosthesis.

He is currently Honorary Archivist to the British Orthopaedic Association and Honorary Curator of the Historical Instrument Collection of the Royal College of Surgeons of England.

He was President of the British Society for the History of Medicine in 1990-1991 and of the Medical History Section of the Royal Society of Medicine in 1991-1992. Vicary Lecturer of the Royal College of Surgeons in 1976 and Hunterian Society Orator in 1992.

Publications include : edited facsimiles of Woodall's "Surgeons Mate. 1617 and Wiseman's "Fractures, Luxations and Gun-shot Wounds. 1676": a "Historical Guide to British Orthopaedic Surgery": chapters on "Surgerybefore anaesthesia" and "Footmythology"; papers on "The history and evolution of surgical instruments", "Surgical instrument composition", "Thermal sterilisation and the surgical instrument revolution 1883-1893"., etc. including related titles in the press, also "The Bath Casualty Hospital 1788-1826, "Le rayonnement d'Ambroise Pare en Grande-Bretagne", "Nicolas Andry et l'Orthopedie", etc.