New inventions in surgical mechanisms / by Richard Davy, F.R.C.S., surgeon to the Westminster Hospital and to the Surgical Aid Society, London.

NEW INVENTIONS

IN

SURGICAL MECHANISMS.

BY

RICHARD DAVY, F.R.C.S.

SURGEON TO THE WESTMINSTER HOSPITAL, AND TO THE SURGICAL AID SOCIETY, LONDON.

LONDON:
SMITH, ELDER, & CO., 15 WATERLOO PLACE.
1875.

Price One Shilling and Sixpence.

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PREFACE.

THE INSTRUMENTS figured in this *résumé* have either been published in the Medical Journals, or shown at the Medical Society of London; my object in reintroducing them to surgical notice is to extend the area of their utility, and to obtain further instrumental knowledge from those who are most competent to impart it.

33 WELBECK STREET,

CAVENDISH SQUARE, LONDON, W.

CONTENTS.

NEW INVENTIONS

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OPERATING NEEDLE.[1]

THE two diagrams exhibit the form of needle that has been invented and used by me for the last seven years in hospital and private surgical practice. The handle

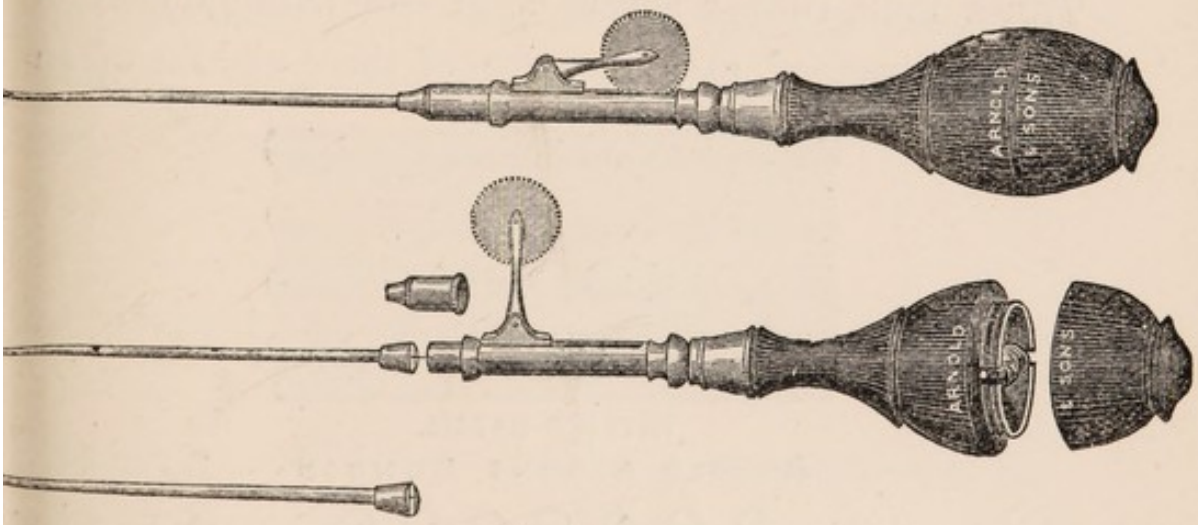

Fig. 1.

contains concealed reel, tramway, and wheel for extrusion or intrusion of wire, and a universal collar for the fixing of any shaped tubular or plain needle. The

[1] Exhibited at the Medical Society, April 20, 1868; and vide Maunder's 'Operative Surgery,' p. 367, 2nd edition.

instrument will carry well wire, gut, string, or carbolised catgut. The tubular aneurism needle is also shown; it inflicts less injury on the vascular sheath than the ordinary aneurism needle. Surgeons may yet be seen in daily practice and in operating theatres, tugging away at sutures to the annoyance of their own fingers and their patients' skin; such inconveniences and constant threadings are entirely obviated by the use of this mechanism.

This needle was originally made for me by Messrs. Mayer and Meltzer, Great Portland Street, W.

WATERPROOF PADDING.—SPLINTAGE.[1]

THESE india-rubber sheets consist of parallel lines of tubing, arranged at a distance of three-eighths of an

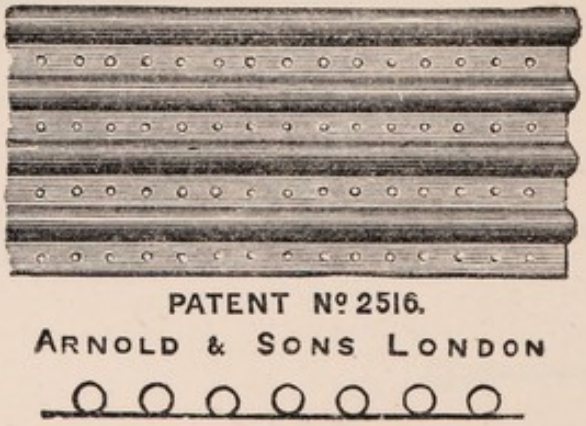

Fig. 2.

inch apart. The intermediate flutings are perforated by punched apertures equidistant five-eighths of an

[1] Vide 'Museum Catalogue.' British Medical Association Meeting, August, 1873, p. 90.

inch from each other, so that equable pressure can be maintained on the splint without interfering with natural discharges. These sheets are very grateful to patients; they may be cut to any required size, and are always clean and ready for use. Solidity can be readily given to the pad by inserting in the parallel tubes soft metal wires or common canes, and then a glue or starch bandage superimposed; such a form of mechanism is admirably fitted for treating simple fractures of the lower extremities in children. The diagram represents the sheet laid flat, and the lower line shows well a section of the parallel tubes of the splintage. I have constantly made use of this splintage in hospital practice: in seven cases of resection of the knee; in simple fractured thigh; in morbus coxæ, &c., and I recommend its use to all surgeons with confidence. It is manufactured by Messrs. Arnold and Son, 35 West Smithfield, E.C.

RETENTIVE DRAINAGE WIRES AND HASTATE KNIFE.[1]

The diagrams illustrate the knife, drainage wire, and tube for introducing wire. I have treated hundreds of abscesses by means of these instruments, and have thereby economised scar. The hastate knife opens the sac of the abscess, then the wire set in the fine end of the tube is introduced through the punctured skin; on

[1] Exhibited at the Medical Society of London, November 4, 1872.

reaching the sac, the elastic wings expand, and retention is maintained at the surgeon's discretion.

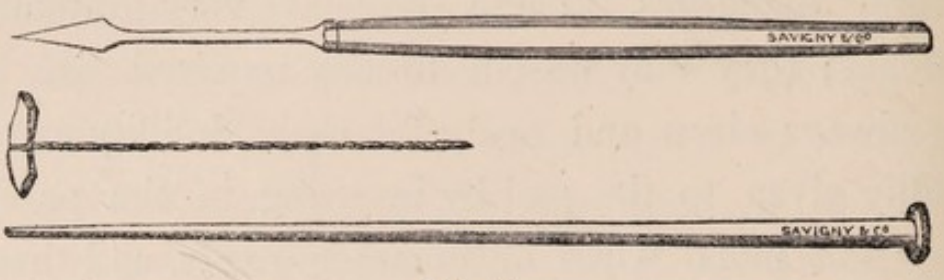

Fig. 3.

MINOR SURGERY CLAMP.[1]

THE drawing represents in section a very handy clamp for the elastic ligature (made for me by Blaise and Co., 67 St. James's Street, S.W.) and has been used successfully for operations on the phalanges, thumb, and great toe, for circumcision, removal of warts from the penis, &c.

The same mechanism may be readily adapted for major operations.

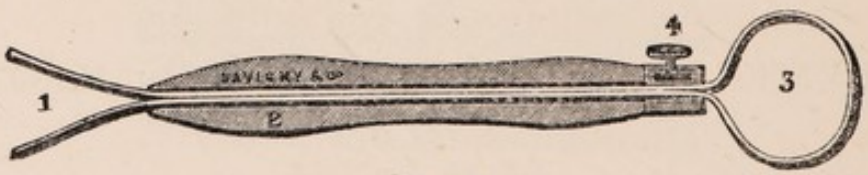

Fig. 4.

The ends (1) of the elastic band are placed at one aperture of the tunnelled handle (2); the loop (3) occupies the other. The surgeon having made sufficient traction on the elastic loop around the part to be operated on, turns the screw (4) on, and fixes the

[1] Vide 'British Medical Journal,' July 18, 1874.

bands. The assistant's hold on the handle is very conveniently out of the way of the operator.

TALIPES INSTRUMENTS.[1]

INSTRUMENT USED FOR TALIPES EQUINO-VARUS AND VALGUS.

SURGEONS treating the various forms of talipes amongst out-patients have been much disappointed at results obtained by the use of the ordinary Scarpas' shoes. I find the screw movements irregular, and especially useless at the very time when most required—viz. at the later periods of treatment, because the screws have reached their maximum range of action. The straps used to confine the foot and heel to the sole are complicated, galling, and ineffectual; with infants quite inoperative, for these little kicking ones cast their shoes as annoyingly as hunters, and frequently ere leaving the surgeon's consulting room. The sole of the shoe (when retained), wears out speedily by the friction on ground, and so one of the most natural processes of cure is interfered with.

Before entering into detail, I must thank Mr. Annandale, surgeon to the Royal Infirmary, Edinburgh, for his courtesy in allowing me to see his ingenious mechanisms for talipes; and his arrangements for confining the foot have been essentially copied. I must also express my obligations to Mr.

[1] 'British Medical Journal,' November 16, 1872.

Arnold, of Smithfield, for his great attention to detail in manufacturing these instruments.

Fig. 5 shows the instrument applied to the foot and leg. Fig. 6 shows the boot when removed. The double irons up the leg and foot piece, joined to them by hinges at the ankle are as generally made. These irons are fastened by straps in young children below

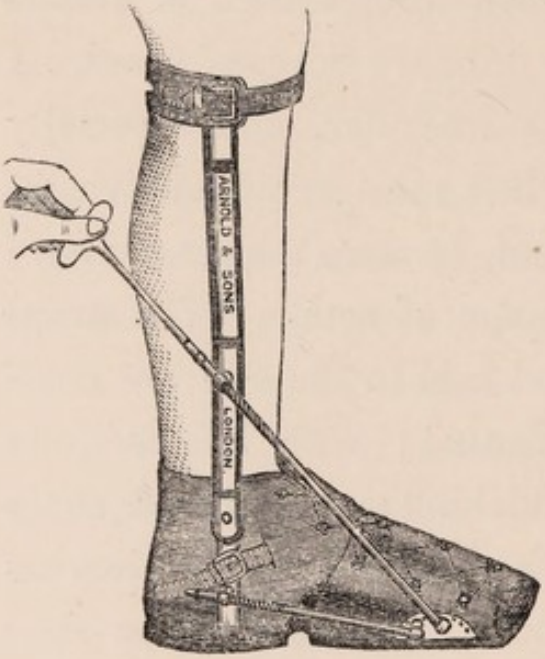

Fig. 5.

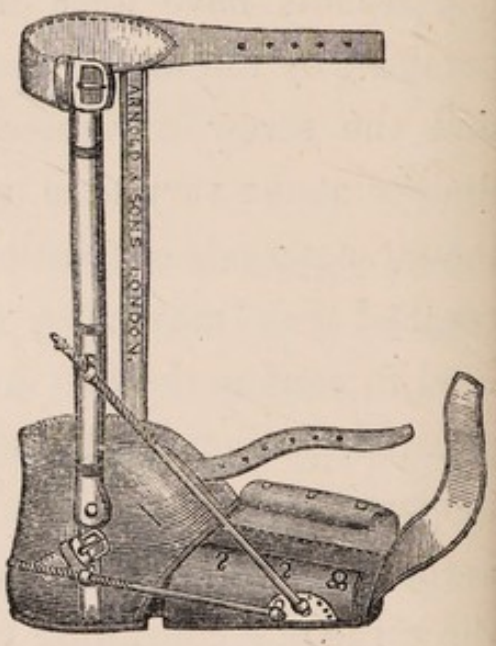

Fig. 6.

the knee, but in infants above the knee, in order that a better purchase may be gained. The circular joint at the sole of the foot corresponds to the situation of the astragalo-scaphoid, and calcaneo-cuboid articulations. Two screws (as shown in the plate), cause (1) the dorsum of the foot to be drawn upwards towards the leg; (2) the anterior part of the foot to be everted or inverted at pleasure. By placing these screws on

the inner or the outer aspect of the leg, talipes valgus or varus may be respectively treated. Both screws are worked by a triangular notched key.

The boot consists of four flaps: one passes directly over the toes, the dorsum of the foot, and the instep, and effectually confines the heel to the special heel plate; a second and third, on each side of the anterior portion of the foot, and a fourth, the heel flap, overlap the central one, and are secured by a stout lace passing over special hooks. The sole of the boot is firmly riveted to the iron foot-plates, and these rivets, passing through the sole to the earth's surface, protect the leather and circular hinge from friction during progression.

A high compliment was paid to this form of shoe by a first-rate instrument maker, who said that it was old-fashioned and that the movements were by no means so complicated as many that he could show me. Old-fashioned and simple though it may be, it is now in constant use, doing its required work well, and not liable to get out of order by fair usage.

NEW WALKING BOOT FOR TALIPES CASES.[1]

In the after treatment of talipes varus and valgus, having so far rectified the distortion as to be able to dismiss the further use of the shoe, figured in the

[1] From the 'British Medical Journal,' May 17, 1873.

'British Medical Journal,' November 16, 1872 (page 548), I have found the employment of the following boot most useful. The mechanism for maintaining the needful invertion or evertion of the anterior part of the foot is placed completely in the block of leather at the heel; a small aperture at the point where the spur box is placed admits the key for the movement. Any dirt is prevented from entering by the circularity of the leather, corresponding to the shape of the steel rod.

Fig. 7.

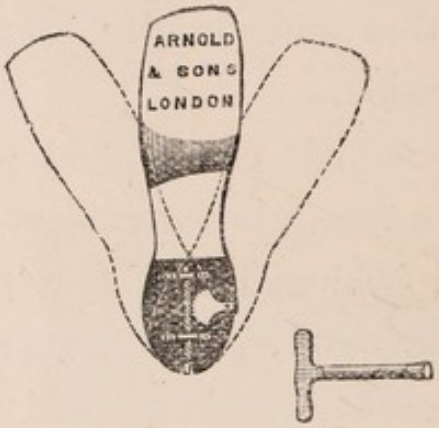

Fig. 8.

The boot has been most carefully manufactured for me by Messrs. Arnold and Sons, 35 West Smithfield, and is well represented in the diagram. Fig. 7 shows the boot applied; the mechanism at the heel is not noticeable. Fig. 8 shows the concealed screw and pinion movement, and the aperture at the heel for the insertion and rotation of the key.

TALIPES BOOT FOR SIMPLE VARUS OR VALGUS.

THE two engravings show a form of hinge at the sole plate which I have found to be of the utmost service in treating these simple varus or valgus cases. By placing the leg iron to the outer or inner side of the

Fig. 9.

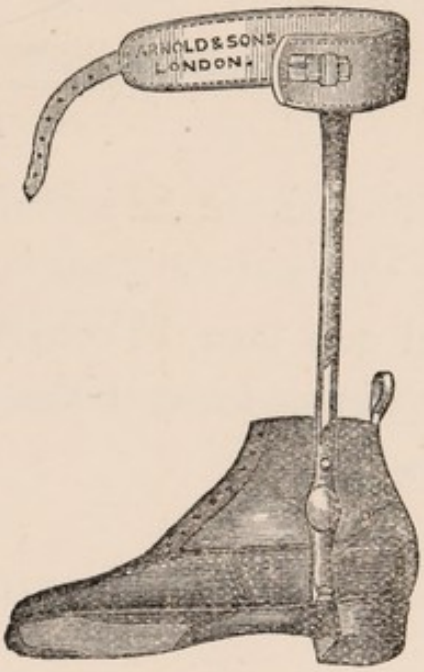

Fig. 10.

foot, the broad strap (through the medium of the hinge at the foot plate) inverts or everts the sole. Messrs. Arnold and Son make this boot, and it has proved to be one of the most useful additions to orthopœdic mechanisms.

SHARP OR BLUNT POINTED TENOTOMY KNIFE.

MOST surgeons prefer operating on tendons without an anæsthetic. At the Surgical Aid Society every tendon I have divided has been so cut; but occasionally, with

refractory babies, inconvenience has resulted either from the incompetence of the child-holder, or the spasmodic jerks of the limb. Messrs. Arnold and Son have carried out my suggestion in fashioning a tenotomy

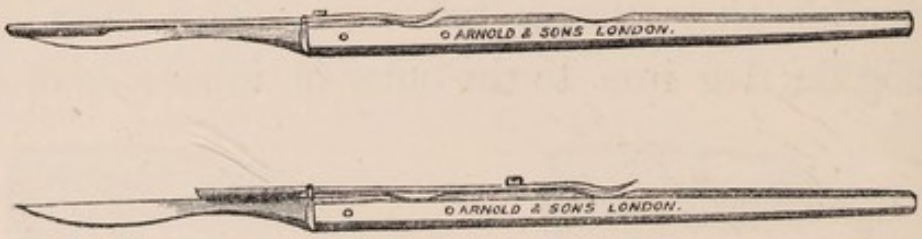

Fig. 11.

knife that can be introduced by the surgeon through the skin and subcutaneous tissue as a sharp instrument, and may then be converted into a blunt-pointed knife by sliding forward the scabbard on the back of the handle.

RETENTIVE CATHETERS.

NO. 1. EXHIBITED TO THE MEDICAL SOCIETY OF LONDON, MARCH 28, 1870.[1]

THE catheter is easy of introduction, of retention, and of withdrawal. It consists of a French vulcanite catheter, through which a string is passed, emerging at a clean hole an inch and a half from the point, and then bridging over the usual opening for the urine, is inserted securely at the point. The opening for the urine is on the opposite side. The handle consists of a leathern collar with a slot in it. There is a knot on this end of the string, and a plug on it. The catheter

[1] Vide 'Lancet,' April 9, 1870.

is introduced on a stilette, and is then retained by pulling the string and fastening it at the distal end of the catheter behind the slot; the plug may be used or not, and the catheter can be withdrawn on unfastening the string. Its action is analogous to that of a finger, the string being the flexor tendon, and the elasticity of the catheter that of the extensor. The terminal portion of the catheter, three-fourths of an inch (when in the bladder), is reduplicated.

Since this catheter was first exhibited some trifling modifications have been adopted, and their results are embodied in the accompanying sketch.

Fig. 12.

NO. 2. THE CROWN METHOD.

I have so named this way of fixing a catheter in the bladder and penis because the penal ring and bisected ends of the catheter somewhat resemble a crown, especially so when the long tapering plug is introduced (see fig. 13).

Fig. 13.

This method may be preferred by some surgeons who object to the reduplication of a catheter in the

bladder. The instrument consists of an ordinary French catheter, bisected at its handle for about an inch and a half, each of which ends button on to the penal ring; the ring is a broad band, also buttoned around the penis, behind the corona. The plug is made of German silver, and extends down the tube for the first two inches. These catheters (No. 1 and No. 2) are sold by Messrs. Blaise and Co.

For the introduction of these limp india-rubber tubes into the bladder I have frequently used the form of slotted silver tube here shown with advantage.

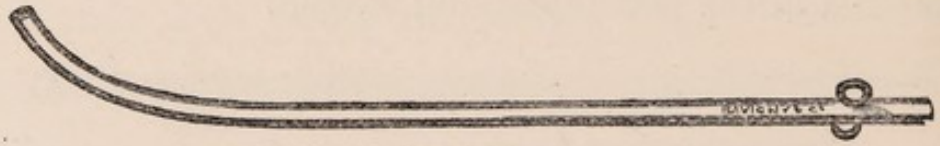

Fig. 14.

STRICTURE DILATOR.[1]

Surgeons who are in the habit of practising immediate dilatation of a stricture at times have found it impossible to introduce Holt's dilator, although a soft stem could be passed through the stricture into the bladder. They have disapproved of dilating the meatus to the same calibre as the stricture, and have been inconvenienced by some minor mechanical details in the handle and bolt of Holt's dilator. The following des-

[1] Vide 'British Medical Journal,' March 14, 1874.

cription and drawings apply to the modified instrument that I generally use in the wards of our hospital.

No. 1. The bolt set up.

No. 2. The bolt divided into three parts, viz. two sliding rods with bulbous-shaped ends; and the handle, which screws on to the end of one rod, and fixes both, as seen in No. 1.

No. 3. The dilator, with central tube from tip to handle, for transit of urine or catgut conductor.

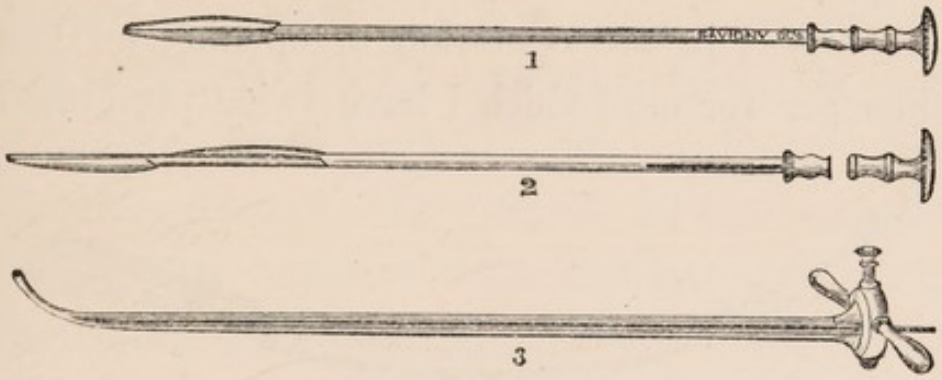

Fig. 15.

These measurements are gauged by English scale. Catgut avant-courrière No. $\frac{1}{2}$. Tip of dilator, 1. Maximum of dilator when bolt is not introduced, 5. Stem of bolt, 7. Bulbous end of bolt (set up), 12. Bolt inserted between blades at meatus, 12. Bolt inserted between blades at point of stricture, 18. By means of this dilator the strictured urethra receives six sizes more than the meatus, which amount of discrepancy may be maintained by subsequent usage of the same instrument. I am endeavouring to ascertain whether or not the inevitable subsequent contraction of the dilated stricture is postponed by the additional rupture.

The whole of the mechanical detail has been carefully worked out for me by Messrs. Blaise and Co., St. James's Street, S.W.

PERINEAL SECTION PROBE-POINTED CANNULA.

In the operation of external urethrotomy, and of perineal section, most surgeons are desirous of ascertaining the nature and size of the urethra posterior to the stricture; in the operation of opening an empty bladder per rectum (which I have twice performed in

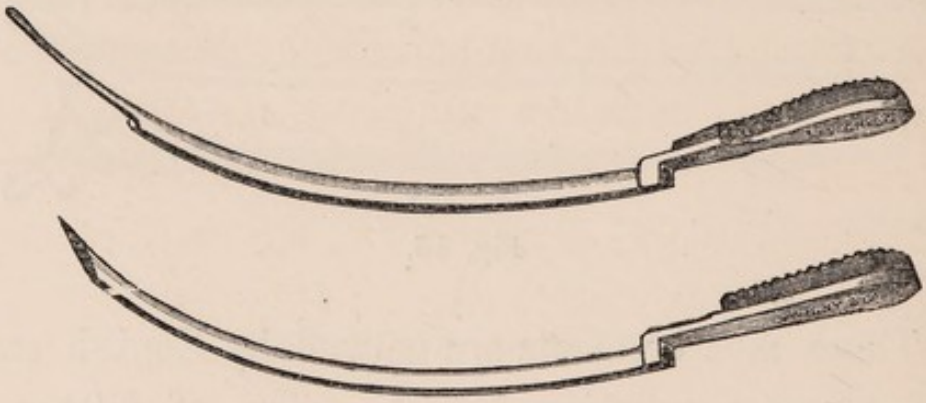

Fig. 16.

the Westminster Hospital for perineal fistulæ), the catheter must be introduced; and for these three operations the probe-pointed cannula is a most valuable adjunct.

The uppermost diagram illustrates at a glance the instrument. The slot running along the central length of the instrument is for the easy introduction and removal of a retentive catheter.

NEW CANNULA FOR PUNCTURE PER RECTUM AND RETENTIVE TUBE.[1]

HAVING been taught at Guy's Hospital how useful an operation puncture per rectum is for selected cases of retention of urine, and having demonstrated at Westminster how extended its application may become for urinary fistulæ, I beg to introduce these instruments to the notice of surgeons. The cannula (fig. 16, undermost diagram) consists of a firm curved steel cylinder, pointed at its extremity, and slit throughout its whole length on the convex border. This slit cylinder is fixed into a flattened handle, that permits the free passage of an india-rubber retentive catheter along the cannula. This retentive catheter has been fully described ('Lancet,' April 9, 1870). By extending the catheter along the convex slit, it readily falls into the cylinder, and may as readily be extricated. The flap of recto-vesical tissue, cut by puncturing the trigone, readily adapts itself in the process of cicatrisation. The catheter retains itself; and by placing the patient on a circular water cushion, the urine is readily conducted into a receiving vessel. It is less disagreeable to have a soft catheter in the rectum and anus than an unyielding silver cannula; and as neither tapes nor retentive bands are used, the parts are kept drier, and therefore cleaner. The motions are passed with less distress,

[1] Vide 'British Medical Journal,' June 14, 1873.

and, by these instruments, surgical interference and the patient's discomfort are reduced to a minimum. In one case of severe urinary fistulæ, the catheter was retained for six weeks with comfort, the puncture completely healing on withdrawal of the tube. The instruments have been made for me by Savigny and Co., St. James's Street.

NEW SOUND FOR OPENING AN EMPTY BLADDER PER RECTUM.

This sound is curved that its tip may press the base of the bladder towards the rectum, and so permit the point of the knife traversing the recto-vesical floor to enter the marked depression at the tip of the sound.

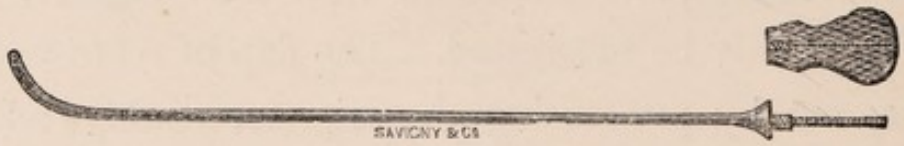

Fig. 17.

Having opened the bladder, a retentive catheter may be introduced by the probe-pointed cannula, or the sound may be drawn out at the anus with a retentive catheter attached to it; the handle of the sound being removable and arranged accordingly. Thus the catheter traverses—1st, urethra; 2nd, bladder; and 3rd, rectum.

Mr. George Lawton and I performed this operation

twice on the dead body during the winter session, 1873; and twice have I given the urethra complete rest for perineal fistulæ unattended with stricture, by thus diverting the flow of urine. These clinical cases at the Westminster Hospital are published in the 'British Medical Journal,' 1875.

LANDING NET FOR CALCULI.[1]

During the operation of lithotomy, I have been often vexed at seeing a stone crushed by removal with the forceps (and thereby a specimen lost), or have waited expectantly to see fragments removed by the scoop, so I venture to suggest that we may gain a wrinkle from fishermen, and use a net for extractive purposes.

The net (of silk or canvas, according to the size

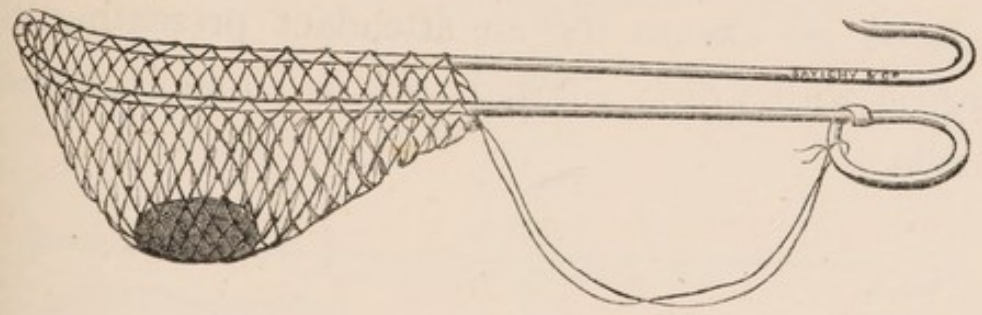

Fig. 18.

of the stone), is made to slide on a curved wire, bent on the principle of midwifery forceps.

After the cut has been made into the bladder, the

[1] Vide 'British Medical Journal,' June 27, 1874.

net is introduced through the wound to the side of the stone or fragments, and by gently tickling the stone and manipulating the net, the stone or fragments (coaxed in) are caught on withdrawal.

Thus stones *plus* silk are the occupants of the perineal wound instead of stone *plus* forceps or scoop. From the dead bladder I have removed stones often by the net; yet, useful as this net may be, it is not so important an ally of the lithotomist as the law of gravitation. Messrs. Blaise and Co. make this net, and will exhibit it to surgeons.

CAUTERY IRON AND HANDLE.

Upholding the value of the actual cautery, yet wishing to detract from its coarseness, I have had our irons at the hospital fitted with moveable handles, so that there shall be no excuse for an attendant presenting the surgeon with a dirty charred stick as an apology for a handle.

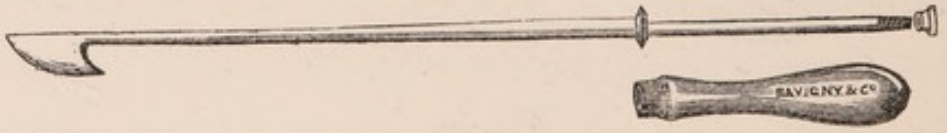

Fig. 19.

The iron is heated *by itself*, and a clean handle is affixed (when required) by passing the iron through the handle, and screwing on a button.

POST MORTEM SKULL TRACTOR, DRILL, AND SAW.[1]

REFLECTING medical men must be often surprised at the clumsy and dangerous method still practised for removing the skullcap in the post mortem theatre.

I have used the instruments here shown very many times, and recommend them for convenience, safety, and temporal economy.

First drill a hole in the vertex, and then insert the

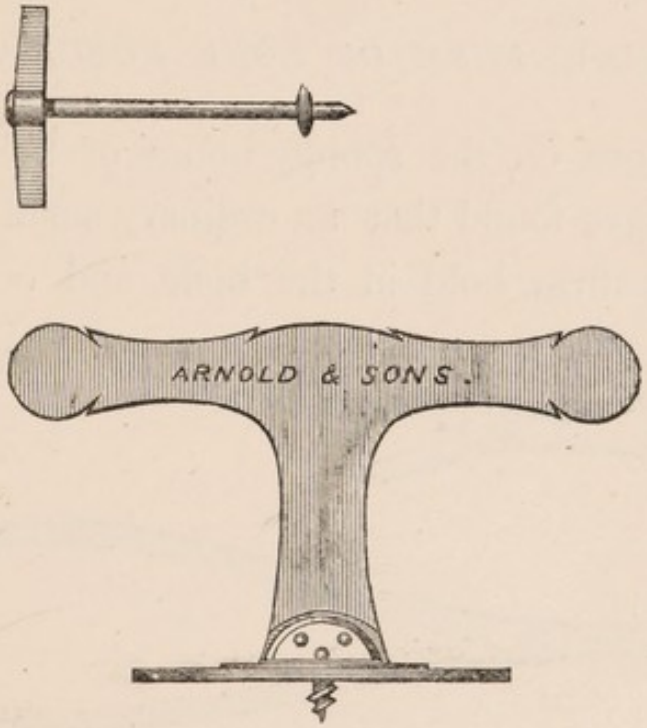

Fig. 20.

screw carefully, which is fixed at the point of the strong T-shaped handle. A circular shield of sole leather

[1] Exhibited before the Medical Society of London, November 21, 1870.

intervenes between the disc and the vertex, to save the teeth of the saw, should the operator let it slip on entering the saw. Next hold the handle firmly in the left hand, and saw in one cut through skullcap, membranes of brain, and brain itself. Wash your section under a gentle stream of water, and you will have accomplished your task. The blade of the saw measures $14 \times 2\frac{1}{2}$ inches (apart from the handle); it has a moveable back, and must be kept in good order.

NEW FORM OF BONE FORCEPS.

In operations on the spongy bones of the carpus or tarsus, I have found that an ordinary small corkscrew takes very firm hold in the bone, and occupies less

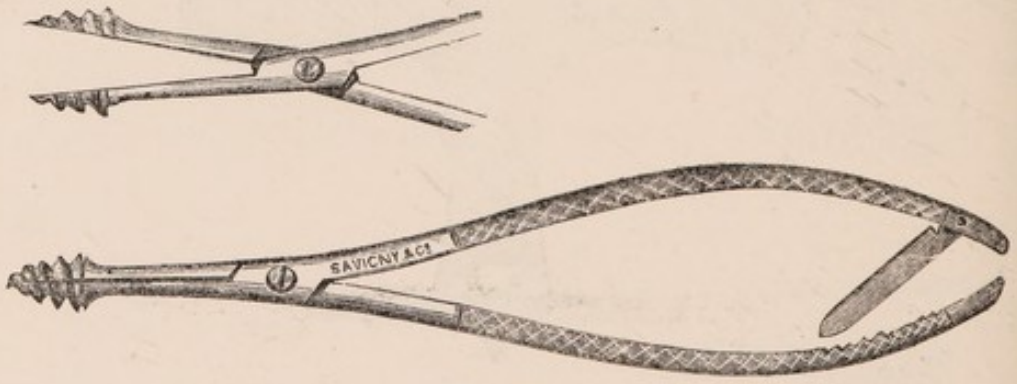

Fig. 21.

space than the 'Lion' forceps. For the same reason I have used the forceps here shown in excision of the hip joint.

The screw at the tip of the jaws is inserted into the

bone; then the expansion of the handle blades opens the jaws and firmly holds the bone. The ratchet between the handles maintains the grip, and so the soft parts around the bone to be removed are cleanly exposed to the view and knife of the surgeon.

LONDON: PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET