A COMPACT OPERATING-CASE FOR MILITARY SERVICE.

WITH A DESCRIPTION OF SEVERAL NEW INSTRUMENTS FOR THE SAME.

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The surgical work of the military surgeon in the field is limited almost exclusively to the treatment of accidental wounds. He seldom is called upon to perform major operations for any other indications. His success as a surgeon depends largely on his proficiency in guarding against wound infection, and his mechanical skill in the treatment of compound fractures. During an active campaign he will often find himself thrown on his own resources with a limited supply of instruments and dressing material, and often without skilled assistance, and under these trying circumstances has often to perform difficult operations which can not be postponed. Military surgery is in every sense of the word, emergency surgery. A quick perception of the nature of the case, and prompt, intelligent action are necessary to perform the many life-saving operations during and after all engagements, when often without warning and with limited preparations hundreds of wounded plead at the same time for surgical assistance. The military surgeon must possess the necessary knowledge and manual dexterity to perform at a moment's notice, and with the simplest instruments and limited assistance, all life-saving operations, in all cases demanding timely intervention to meet the urgent indications. Aseptic surgery has necessitated a great change in the manufacture of surgical instruments. All attempts at ornamentation have been abandoned. The beautifully carved handles and blades that adorn the pages of ancient works on surgery have become objects of curiosity, and are to be found only in the shops of dealers in antiquities. The modern surgical instruments are made as plain and smooth as possible. Knives and retractors are made of one piece of metal, and niches and crevices are avoided whenever this can be done, and scissors and forceps are constructed so that the two parts can be readily separated and joined together again, to facilitate thorough cleansing and sterilization. Another great improvement noticeable in the instruments in use at the present time is their smaller size and more delicate construction. The old-fashioned, sword-like amputating knife is seldom seen now, as any amputation can be done with a medium-sized scalpel, since surgeons have abandoned transfixion methods. The best surgeons need the fewest instruments. Very few instruments are required to perform any operation, provided the selection is made with the requisite care, and the surgeon is familiar with their use.

The military surgeon should from the very beginning of his professional career endeavor to do his surgical work with as few instruments as possible. For field service the instrument case as well as the instruments should be well adapted for emergency work. Aseptic surgery has made it necessary to make a radical change in the construction of instrument cases. Within the memory of nearly all the older military surgeons the method of packing, storing and transporting of surgical instruments has undergone a somewhat rapid succession of notable changes, and while each has marked an advance in the mechanics employed, it is evident that the inventive skill of the instrument-maker has not kept pace with the rigid demands of aseptic

surgery. The old-fashioned velvet-lined instrument box and pocket-case very fortunately disappeared some time ago, and were replaced by wooden boxes with carved spaces for each instrument, devoid of any lining, and the so-called aseptic pocket-case. In due course of time, the wooden boxes had to give way to another improvement—the metallic cases, which for some time appeared to answer the modern requirements. In the metallic cases the instruments were held in their places by hooks, loops and cross-bars, and it was not always easy after their use to return them to their proper places, to say nothing of the damage inflicted upon the instruments in the transportation of the cases and the disagreeable rattling caused by the instruments not held firmly in position. An instrument case for field use must contain all the instruments necessary

for emergency operations; it must be compact, and so arranged that the case and its contents can be sterilized by the simplest and quickest method, and the instruments, after use, can be replaced without any difficulty and unnecessary loss of time. Cases made of wood or metal are entirely out of place in the field. They are apt to get out of order by hard usage, and add unnecessary weight and bulk. For a number of years the writer has made an extended study of the contents and case for surgical work in military and emergency surgery. He has found by observation and ample experience that the instruments used in emergency work can be safely carried in roll-up, washable, canvas rolls, in which each article is held securely in place by non-elastic loops. If the name of each instrument is stamped with indelible ink in the place it should occupy, there will be no difficulty experienced in replacing properly and quickly the entire set after use. This plan constitutes an ideal method, for it makes pro-

vision for changes that might appear desirable in the set, and discarding such as might be regarded as unnecessary, and additional patterns may be included from time to time. A second and similarly stamped roll, properly sterilized, should be in readiness in a separate compartment of the outer leather case, so that the instrument may be transferred to it after each exposure to infection. The form and character of the outer wrapping of the canvas roll holding the instruments is of the greatest importance. It should be light, soft and flexible, without any sharp corners, and, if possible, small enough to be carried in a hand-bag or overcoat pocket. The outer cover of the author's field-case is made of soft leather, with rounded ends and corners, with a double compartment, one for the roll of instruments, the other for the empty canvas roll. A slip-handle, also of leather, is provided,

so that the case can be carried like a hand-bag. For military service a leather strap is attached, so that the case can be carried over the shoulder.

The instruments selected for this case are the following:

One combined metallic male and female catheter; 11 Kocher's hemostatic forceps; 1 Abbe's hemostatic forceps and needle-holder combined; 1 small scalpel; 1 large scalpel; 1 straight bistoury; curved, sharp-point bistoury; 1 small tenotome; 1 tenaculum; 1 straight scissors; 1 scissors curved on the flat; 1 MacLean's folding amputating knife; 1 bone-cutting forceps; double-end retractors, with guards; 1 author's saw, with guard for blade; 1 plain dressing-forceps; 1 ligature-carrier and retractor; 2 author's tissue forceps, with 3 and 5 teeth and catch slide; 1 bone chisel; 1 bone gouge; 1 sharp spoon and periosteal elevator; 1 author's bullet-forceps; 1 author's bullet probe; 2 ordinary probes; 1 exploring trocar; 12 silkworm-gut sutures; 12 surgical needles (assorted); 2 skeins of braided silk; 1 coil of silver wire; 6 needles for intestinal suturing.

The six knives are included in two protecting metallic plates that rest side by side, forming one fold of the canvas roll.

The knives are made of one piece of steel and the handles are corrugated, ensuring a firm grasping surface. The most important feature of the list of instruments is the large number of hemostatic forceps. Besides the eleven Kocher's forceps, the Abbe's and tissue forceps are available for hemostatic purposes. The Kocher pattern is given preference because it combines the artery crushing power of the serrated designs with the delicate adaptation of the mouse-toothed variety. With this double hold on the tissues there is very little risk of losing its grasp. If a deep vessel requires to be tied and the ligature does not readily slip into place, two instruments are applied close together, and by separating the locked handles a cone is made by the grasping ends of the forceps over which the ligature readily glides away from the instruments into its proper place. Although the author never uses anything but an ordinary scalpel in performing any amputation, he has included in the set MacLean's folding knife, which may prove a convenience to many surgeons who are in the habit of using larger knives. The retractors, two in number, are each provided with blunt and sharp retracting blades. The latter are three-pronged, and are furnished with guards that permit of safe use of the sharp end as a handle when using the blunt end. The bone-cutting instruments comprise a cutting forceps, the author's saw, a sharp spoon and periosteal elevator, a chisel and a gouge. A mallet is not included, as a substitute for this instrument can be found almost anywhere. The bone-cutting forceps will answer an excellent purpose if only a limited amount of chiseling is to be done.

The smaller instruments are of the author's patterns, and will be described below, while the small instruments are of the usual forms.

The canvas cover is eight inches in width and, including flap, 31 inches in length. The whole is encased in a flexible leather cover, 9 inches in length, 5 inches in breadth, and 5 inches in thickness, and weighs, complete, 4½ pounds. One of the principal advantages of the instrument case is that after removing the canvas cover from the leather case, the cover, with all its contents, including needles and suturing material, can be sterilized at a moment's notice by boiling for a few minutes in a soda solution.

After the operation the instruments are to be thoroughly cleansed, dried and transferred to the second aseptic canvas cover. The author made use of one of these cases during the Spanish-American war, and his experience with it during that time has convinced him that it possesses merits which should entitle it to the careful consideration of military authorities. To make this case useful for military service, the author found it necessary to devise a number of new instruments, which it contains, in order to meet the demands made necessary by the small-caliber, jacketed bullet, and others to adapt them for emergency work. These instruments require a brief explanation.

BULLET PROBE.

The metal encased bullet has made the famous Nélaton bullet probe almost obsolete, as the test for lead which it yielded by rubbing the porcelain tip of the probe against the leaden bullet will no longer be of any diagnostic value in searching for modern bullets. The tip of this probe is likewise too small in following the tubular wounds made by bullets. The author's bullet probe consists of a soft metal, flexible rod, pointed in the center and tipped at both ends with porcelain bulbs, as at this time the old-fashioned leaden bullet has not

been entirely abandoned in warfare, and remains in common use in civil life. The porcelain tips are made to correspond in size to the caliber of the bullets commonly used; that is, one corresponds to the 22 and the other to 38, French scale. Probing for bullets in recent gunshot injuries is seldom justifiable as a diagnostic resource, but in cases in which it is deemed advisable by the nature of the wound and the probable location of the bullet the bulbous end of the probe should correspond as nearly as possible to the caliber of the bullet, as false passages are more likely to be made with a small instrument than one which corresponds approximately to the size of the bullet. In the old porcelain-tipped probe some risk always attended exploration by the porcelain bulb becoming detached and remaining as an additional foreign body in the wound. Heretofore, in the construction of probes with this class

of tips, the porcelain bulb has been attached to the rod by boring or moulding a perforation in the bulb, which the wire rod would fit, and fastening the two parts together with cement. This procedure was a well recognized defect, and resulted not infrequently in losing the bulb in the wound, an accident which occurred in the writer's own practice. After much experimenting, a probe has been made with a perforation through the whole thickness of the bulb, the rod passing through the whole length of the perforation, its distal end being riveted in a small depression on the surface of the bulb.

This modification in the manufacture of the probe renders the instrument perfectly safe, and without detracting the least from its value as a diagnostic instrument. The diagnostic value of the probe has been greatly enhanced by furnishing the ends with porcelain tips which in size more nearly correspond to the caliber of bullets in most common use. The full length of the pointed probe described is nine inches.

BULLET FORCEPS.

Since leaden bullets have largely given way to a core of lead surrounded by a hard metal mantle, it has become necessary to change the construction of forceps intended for their extraction. At the time when the leaden bullet was used exclusively, it was possible to remove them with the aid of forceps with short, tenaculum-shaped jaws, because with even a light force it was easy with such an instrument to penetrate the lead, thus securing a grasp sufficiently firm for its extraction. Such instruments are, however, practically worthless in attempting to extract a steel or nickel-encased bullet. The American bullet forceps, which retained its well-earned fame as long as its use was limited to the extraction of leaden bullets, must now give way to instruments with a better grasping power. It is evident that forceps with concave serrated jaws would answer in such cases, provided the grasping surface would correspond in size with the metal jacket. To use efficiently a forceps of such construction would necessitate several forceps with different grasping capacities and a previous knowledge of the exact size of the bullet to be extracted. An in-

strument to be of use in all cases must be one that is so constructed that it will grasp securely bullets of any size. This object is gained by forceps with concave jaws, the terminal margins of which are provided with two short, strong teeth, sharpened to a fine point. A third shorter and stouter tooth, interposed between the two lateral teeth, would form in each jaw a third point of contact in case of smaller bullets. The forceps terminates in a blunt cone, which makes the instrument available when closed as a bullet probe in the absence of instruments specially adapted for this purpose.

MINOR OPERATING SAW.

This instrument consists of a slender blade provided with a lifting back and attached to a small, solid handle of such shape as to admit of a firm grasp of the instrument. The fenestrum in the handle reduces the weight of the instrument and increases the grasping surface.

RAT-TOOTHED TISSUE FORCEPS, WITH CATCH SLIDE.

This forceps is of the spring-blade type, with slide catch. These forceps can be used for dissection and hemostasis, and can be made useful as retractors. The jaws are of the rat-tooth variety, the smaller size with three and the larger with five teeth.

SARCOMA OF VERMIFORM APPENDIX.—

SARCOMA OF THE EXTERNAL URETHRAL ORIFICE.

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BRIDGETON, N. J.

I. H., male, aged 51 years, blacksmith, had for more than a year recurrent attacks of pain in the right iliac fossa, becoming more severe, so that five weeks before entering Bridgeton Hospital, for operation, he had been confined to the house for three weeks by an attack. The question of malignancy was considered, because his father had died of "cancer," and on tracing history of father's case, I find that the cecum was much thickened and softened, but no microscopic examination was made. I mention this because Hollender has recently stated that "cancer of intestine is apt to recur in families." Having opened the abdomen, by the usual incision, we found the appendix lying posterior of cecum, pointing upward and slightly outward, firmly adherent and bound down by results of previous inflammation. It was severed near the cecum, and peritoneum closed over stump by mattress sutures; the cecum did not appear to be invaded. The abdomen was closed in layers. The appendix was about 1½ inches in length, firm, thickened, lumen almost obliterated. Sections examined microscopically proved it to be a small round-celled sarcoma. Five months have passed and patient seems perfectly well, has gained fourteen pounds, and is at work.

This is the third case of sarcoma of the vermiform appendix to be reported; the others have been reported by Glazebrook,¹ and by J. Collins Warren.²

R. A., female, age 47, was annoyed by pain, irritation and bleeding. On examination, a dark-red, somewhat eroded mass was found, with base at urethral orifice. Free dissection of vestibular space and removal of anterior half of urethra was made. The mucous membrane of urethra was attached to the skin by silkworm-gut sutures. A catheter was placed in the bladder, and the vagina packed with gauze.