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THE REDUCTION OF THE FRAGMENTS PRELIMINARY TO INTERNAL SPLINTAGE IN CASES OF FRACTURE OF THE LONG BONES.

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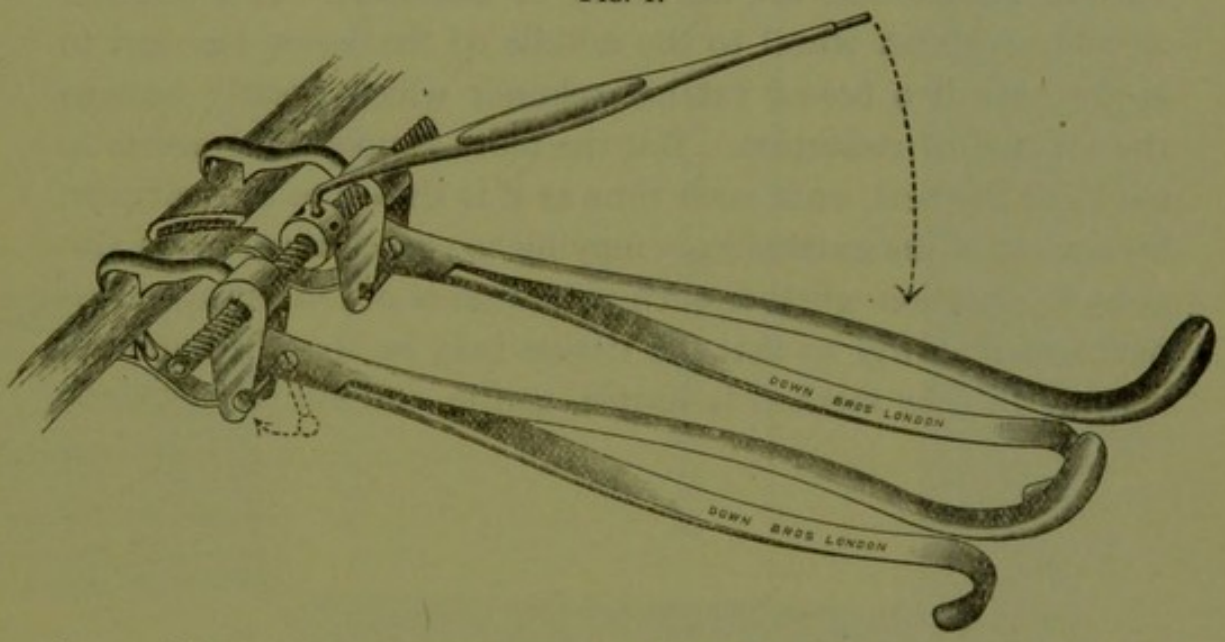
IN ANNALS OF SURGERY, November, 1912, p. 769, Gerster publishes an interesting article on "The Reduction of the Fragments in Fractures of the Long Bones." The need for some mechanical device to effect reduction has long been felt. During the operation great difficulty is often experienced in reducing and maintaining the fragments in correct alignment while a Lane's plate is applied and this is particularly the case in fractures near the middle of the shaft of the femur of some weeks or months duration, so much so that occasionally after repeated attempts at reduction have failed it is necessary to remove portions of the ends of the bone in order to obtain correct apposition. Although much can be done by extension applied immediately in recent cases and particularly by employing Jones' method with a Thomas' knee splint, there still remain a certain number of cases in which the result is bad. The requisite care in nursing may not always be attainable and in outlying districts medical aid may not be so easily procured as in towns. Such cases come to operation. During the operation much of the force used in producing extension is applied through the knee-joint and sometimes synovitis is set up. The procedure is the reverse of elegant and is excessively tiring to the assistants. When operation is performed in the house occupied by the patient there may be difficulty in finding supports for any pulley extension such as the operator is accustomed to use in his own theatre. These considerations led me in October, 1911, to devise an apparatus that would help to render reduction easy. It was clear that the method should involve applying the force of separation as a

direct interaction between the fragments themselves. In principle the apparatus was similar to Gerster's turnbuckle. At first it was arranged that one end of the extension screw should pass through a hole bored centrally through the joint of one of the bone-holding forceps, while the other end passed either through a similar hole in the other, or in front of or behind this hole according to the relative positions of the fragments; but it was found that this arrangement, though readily causing the separation of the fragments, failed in affording easy alignment and coaptation. I am much indebted to Mr. H. W. M. Gray for having tried the instrument at this stage in one of his cases on Jan. 24, 1912. This instrument was also shown at the meeting of the British Medical Association, held at Liverpool in 1912. The instrument was then modified in such a way that the sliding piece on one end presented a slot in which the bone-holding forceps could slide, but again the comparative fixity of the other end rendered adjustment both of the fragments and of the instrument difficult, because the forces in operation are considerable. The instrument was again modified so that a slot was formed in each end piece and each was provided with a hasp so that the bone-holding forceps could be shut into the slot without the risk of its coming out during the progress of extension. This instrument (Fig. 1) is applied in a similar manner to Gerster's, that is to say, extension is carried out as far as possible by ordinary means without using undue force and the fragments are seized with Lane's bone-holding forceps applied parallel to each other and as near together as possible. The pieces on the screw are then adjusted equally from the middle to fit the distance between the forceps and the instrument is lowered over the forceps so that the slots engage them and the hasps are closed up. The handles of the forceps are held one in each hand by an assistant and the screw is turned by the operator until the full extension has been produced. Coaptation being thus secured is maintained, if necessary, by using a third bone-holding forceps to grasp the fragments. At this stage it

may or may not be convenient to remove the extending instrument according to the case. The plating is now proceeded with. The instrument affords the following advantages:

First, it is applicable to all the ordinary bone-holding forceps of the Lane type in general use, so that no additional or special forceps need be provided. By using a Lane forceps much room is gained in the wound for manipulation of the plate because the bows of the Lane forceps afford ample room for inserting the plate and screws while the forceps are still

FIG. 1.



in position. The great desideratum in these operations is more room in which to work without increasing the size of the wound.

Secondly, it is not necessary to interrupt the process of extension and change the apparatus. The length of screw provided is sufficient for all ordinary cases in which the fragments have been separated as far as possible before the forceps are applied. In many cases the instrument will not be required, such as recent cases in which extension has been employed from the first. Such cases are treated by open operation because of the difficulty of securing proper attention when external splints and extension are used. At operation complete reduction is easily obtained, but occasionally it may be helpful to have the instrument at hand. In cases in which

an additional fragment or splinter is present there will be comparatively little difficulty if the case is recent and anæsthesia profound, but if the condition is of old standing the difficulty may be very great indeed and the instrument will be required. It is clear that there is a call for an instrument of this kind because two surgeons have independently designed one, and since both have employed the same principle in its construction it is probable that this principle is the best. At the present time it seems to me to be open to question whether further refinements are necessary or advisable. It is possible to add a ratchet wheel to the middle of the screw bar and to apply over it a boxed ratchet spanner which greatly hastens the process of reduction. But the more simple thing seems to me to be the best, until such time as it is shown to be inefficient by reason of the extension occupying too much time. It is also open to question whether such extension is not safer when it is performed slowly so that the tissues may be stretched and not ruptured. The method is simple, gentle, and entirely efficient