

## INVENTIONS I HAVE SEEN DURING THE WAR.

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One of my joyous memories of long ago concerns an old drill-instructor. He paraded his little band of flappers with the rigour that he had brought to the drilling of real soldiers, and one's awe of him was mingled with much pride. But the fascinating thing about him was that his head waggled. Without ceasing it wiggled, waggled, and the tradition was handed down from generation to generation that he was a Crimean veteran, and that a bullet, imbedded in some unassailable spot, was the cause of the *perpetuum mobile*. I remember well the painful effort necessary sometimes to keep one's mind fixed on the words of command, when it was really intent on the mystery of the historic bullet, and its exact whereabouts!

Little did I think how, in after years, the figure of the old sergeant would take shape out of the mists of the past, and how, day after day, week after week, month after month, I was to watch the solving of such mysteries and the tracking down of such elusive projectiles by means that would have seemed like magic then.

*The Electric Vibrator.*—The first invention that I saw in the early months of the war for the finding of projectiles, was the electric vibrator (Electro-Vibreur) of Professor Bergonie, of Bordeaux. This was a large, cylindrical-shaped, electric magnet, which could be suspended either from a support running across the operating-theatre, or from a gallows-like erection fixed to the wall by hinges, so that it could be slung out over the operating-table when required. Except in cases where the projectile was known to be very near the surface, the approximate position was determined by means of the X-rays, and marked. The patient having been prepared for operation, the magnet, draped in a sterile towel, was brought over the table and lowered, enough space being left to permit the surgeon to lay his fingers on the patients' skin underneath. The current was then switched on, and if the projectile was not very deeply imbedded a distinct vibration could be felt over the spot where it lay. In cases where the foreign body was known to be deeply-seated an incision was first made by the surgeon, the vibrator being applied from time to time, until the object was found. It is to be noted that the vibrator, although it is a magnet, is not intended to

extract projectiles but to aid the surgeon in locating them, by causing them to vibrate.

A great deal of time was saved by the use of this invention, which had excellent results. It had one drawback, which was that it was necessary to remove all clips and retractors, when the current was turned on. A rather amusing and somewhat startling effect was sometimes produced when, in the excitement of the hunt, this precaution was forgotten, and the said instruments stood up on end with a loud clatter in an attempt to reach the magnet! This drawback, however, was eliminated by some surgeons, who provided themselves with retractors and clips made of copper.

*Hirtz's Compass.*—This was a most ingenious device, which applied geometrical calculations to the findings of the X-rays. When the radiographing was properly done and the compass carefully adjusted it was infallible. It consisted of a small, adjustable, steel framework with supports, and a central indicator, the supports and indicator being of the circumference of a slate-pencil, and introduced through holes in the framework, where they were held in position by screws. When the supports were placed carefully on positions determined and marked on the patient's skin during the X-raying, the central indicator pointed to the exact spot in which the projectile was imbedded. The depth of the foreign body below the surface was indicated by the height at which the indicator stood above the surface. This method was particularly successful in thoracic and abdominal operations, but great care had to be taken that the position of the patient on the operating table was exactly the same as during the X-raying. The slightest deviation upset the mathematical calculations, and defeated the object of the compass.

*Fabaume's Apparatus.*—This invention was slightly reminiscent of the old-fashioned projectile-finder, in which two long thin prongs, connected with a battery, were used for the probing of wounds, causing a little electric-bell to ring when the foreign body was encountered! When using Labaume's invention, the surgeon adjusted on his head an apparatus similar to that used for listening to the phonograph; he introduced, also, into a finger of his glove, a small metal plaque, connected by wires to a battery. An incision having been made in the direction in which the projectile was believed to lie, the current was turned on, and by means of an ingenious mechanism, a humming noise was heard as the foreign-body was neared, the noise increasing in volume as the

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