

**REMOVAL OF A RIFLE BULLET FROM THE  
RIGHT LOBE OF THE CEREBELLUM; ILLUSTRATING THE  
SPONTANEOUS MOVEMENT OF A BULLET IN THE BRAIN.\***

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THE following case is chiefly interesting as being a good example of the spontaneous movement of a bullet within the brain. Indeed the bullet not only moved, but turned round—spontaneous version.

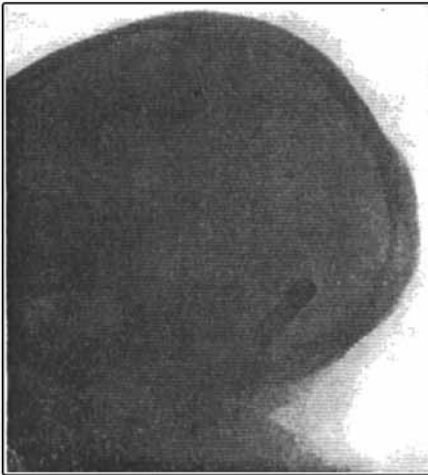


FIG. 345.—Lateral view of skull. Bullet lies nose downwards and forwards in cerebellum, 3 cm. from os occipitale. The x marks point of entry.

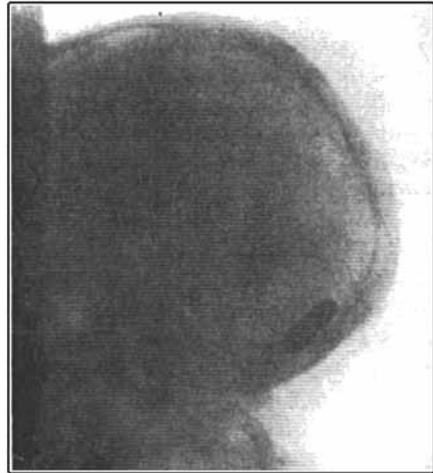


FIG. 346.—Lateral view of skull 19 days later. Bullet now lies nose upwards 1 cm. from os occipitale.

The patient was a Tartar boy, age 18, a chauffeur. He was shot in the head on the afternoon of Feb. 28, 1917, during the Revolution. Judging by the position of the wound and by the course taken by the bullet, the shot was probably fired from a house-top. He was admitted to the Anglo-Russian Hospital in a semi-conscious condition within a few minutes of being wounded. He vomited several times in the first half-hour. The wound was situated 12 cm. above and 1 cm. behind a line drawn vertically upwards from the pre-auricular point. The scalp was shaved and the wound explored, without

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anaesthesia. The bullet track ran downwards and backwards through the meninges. There was remarkably little splintering of the skull. The bullet was not palpable. The patient was *x*-rayed the following day, and a rifle bullet was seen to be lying in the right cerebellar fossa. The bullet lay obliquely, with its nose downwards, inwards, and forwards, suggesting that it had been deflected somewhat after entering the skull. It lay embedded some 3 cm. deep in the right lobe of the cerebellum (*Figs. 345, 347*). Considering the serious condition of the patient and the depth of the projectile, it was considered inadvisable to attempt immediate removal. Clinically, the chief localizing signs were nystagmus towards the right, a tendency to fall always towards the right side when made to take a few steps, and right-sided dysdiadochokinesia.

During the ensuing days he gradually improved, and on March 19 fresh *x*-ray photographs (a stereoscopic pair) were taken preliminary to operation.



FIG. 347.—Antero-posterior view of skull. Bullet lies obliquely in right lobe of cerebellum, its base towards middle line. (Plate made with tube in front, plate behind.)



FIG. 348.—Antero-posterior view of skull 19 days later. Bullet lies almost horizontally, base outwards. (Plate made with tube behind, plate in front.)

It was now seen that the bullet had moved during the nineteen days that the patient had lain upon his back. It had sunk backwards until it was now separated from the inner surface of the occipital bone by barely 1 cm. This general movement backwards had been accompanied by a version of the bullet, so that its nose, which formerly pointed forwards, downwards, and inwards, now pointed backwards, upwards, and inwards (*Figs. 346, 348*), the general lie of the bullet being now horizontal. The bullet had therefore traversed a distance of some 2 cm., and, as will be seen from the plates, its base had gone through a relatively large excursion.

It is unfortunate that the later antero-posterior radiograms were taken from before backwards, the earlier one having been taken in the reverse

direction. However, there can be no doubt about the fact that the bullet has actually moved considerably in this case, though Gamlen and Smith<sup>1</sup> are doubtless right in believing that such movement is often apparent only, due to failure to reduplicate exactly the former position of the head.

On March 24 the bullet was easily extracted from the right lobe of the cerebellum. The upper fibres of the trapezius had to be divided at their origin from the os occipitale, and after removing a disc of bone with a hand trephine, bone was clipped away freely. The lateral sinus was exposed in this procedure, and the dura incised horizontally below it. The bullet was found lying in a shallow abscess cavity, the pus from which proved to be sterile on culture. The patient made an uneventful recovery. Six weeks after operation the only symptom remaining was the dysdiadochokinesia.

At no time was there any disturbance of vision, yet the line of the bullet, had it taken a direct course, must have passed through the right calcarine fissure. My confrère, Professor Poussep, suggested that in view of this absence of visual upset, it is probable that the bullet ran backwards, pierced the left tentorium cerebelli, and then crossed into the right cerebellar lobe. This, I think, is very probably the correct interpretation. A slowly-travelling bullet would easily be deflected by so rigid a structure as the tentorium.

As to the wandering of the bullet, Flourens, it is interesting to recall, found that bullets experimentally introduced into the cerebrum and cerebellum always tended to sink towards the base of the skull.<sup>2</sup> Krause, in his monograph,<sup>3</sup> records a case where a revolver bullet moved a considerable distance (Kugelwanderung) in a few weeks and then came to rest. Vilvandré and Morgan<sup>4</sup> have published a case in which a shrapnel ball apparently rolled round as well as sank backwards.

In general, the movement of bullets in the substance of the brain must, I think, be attributed to a combination of any or all of the following factors.—

(1) The action of gravity, the specific gravity of the bullet being far higher than that of the brain; (2) Local softening of the brain around the bullet, or abscess formation; (3) The pulsations of the brain. The twisting or version of the bullet is probably caused by the following—(1) Unequal softening round the bullet, allowing, for example, its base to sink before its nose; (2) Uneven distribution of weight in the bullet itself, the posterior half being heavier than the anterior; (3) The homogeneity of the brain tends to a general and even sinking, but anything which interrupts this homogeneity, such as a leash of blood-vessels, might impede one part of a bullet, and so cause it to turn.

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#### REFERENCES.

- <sup>1</sup> "Inter-relation between the Radiography and Surgery of Gunshot Wounds of the Head," *Brit. Jour. Surg.*, 1917, July
- <sup>2</sup> Quoted by ROWLANDS and TURNER, *The Operations of Surgery*, 1915, 1, 286. London.
- <sup>3</sup> *Der Chirurgie des Gehirns*, Berlin, 1909.
- <sup>4</sup> "Movements of Foreign Bodies in the Brain," *Arch. Radiology and Electrotherapy*, 1916, June.