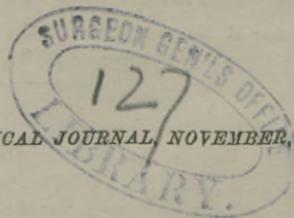


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A CASE  
OF  
GRAPESHOT-WOUND  
OF THE CHEST.

BY  
JOHN ELLIS BLAKE, M. D. (HARV.),  
MEMBER OF THE NEW YORK ACADEMY OF MEDICINE, MASSACHUSETTS MEDICAL SOCIETY,  
CONNECTICUT MEDICAL SOCIETY, ETC., ETC.

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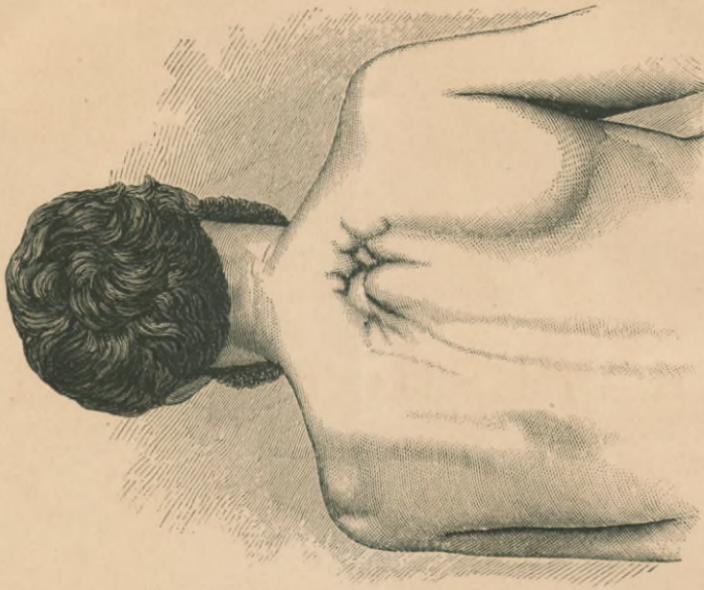
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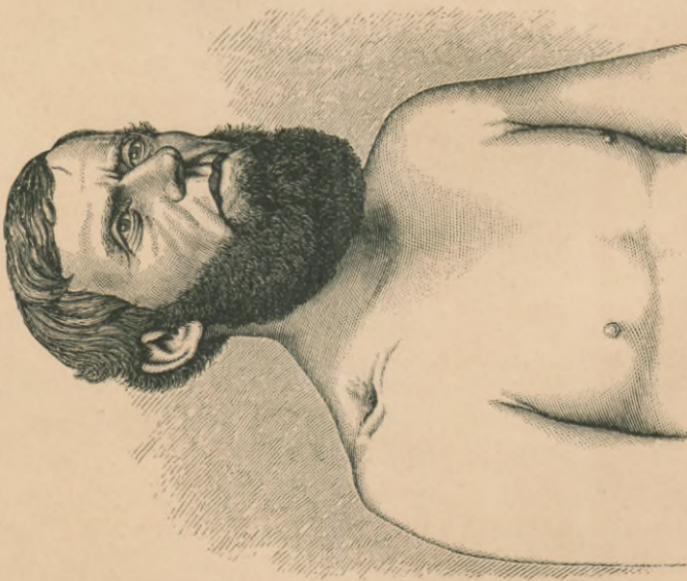
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Posterior view.



Anterior view.

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## A CASE OF

# GRAPESHOT-WOUND OF THE CHEST.

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THE bloody wars waged during the last two decades of the world's history are no less remarkable for the numerous inventions to which they have given rise for the saving of life, and the lessening of suffering, than for those which increase man's power to mutilate and destroy.

Modern science has done so much for surgery, during the period alluded to, that the list of wonderful recoveries from the most serious injuries has been rapidly growing longer. Upon this list, as I am well aware, are numerous instances of entire recovery after wounds of the chest, penetrating or completely traversing the lung; so many, in fact, that the present case would not have been deemed of sufficient professional interest to merit report, but for certain points giving it a somewhat exceptional character. These are: 1. The completeness of the recovery from a wound in such a *situation*, caused by so *large* a missile. 2. The wonderful escape from injury of most important and vital parts. 3. The complication of fragments of bone remaining for some months impacted in the lung.

The patient, Colonel George N. Lewis, of the Twelfth Connecticut Volunteers, was recently in New York, and was kind enough to allow examination of his present condition, by several different members of the profession, presenting himself for that purpose, also, at a meeting of the New York Academy of Medicine, and of the Medical Society of the County of New

York. At the meeting of the latter Society, I read as faithful an account of the facts in the case as I could render from the meagre notes of it in my possession. From the same source the present report is made up. The patient was wounded

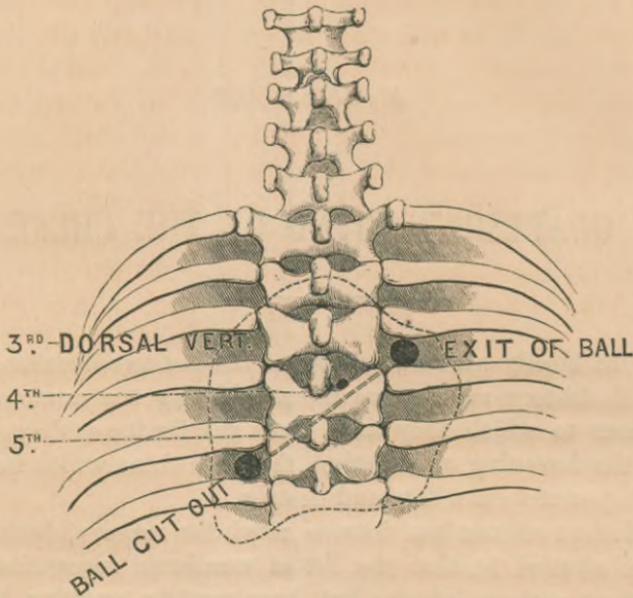
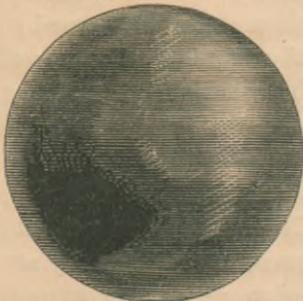


Diagram showing the course of the shot across the vertebral column.

May 27, 1863, before Port Hudson, by an iron grape-shot, one inch and a half in diameter, weighing half a pound. This shot, being deflected from a horizontal course to one almost vertical, by the limb of a tree, struck the patient on the upper surface of the right clavicle, and fractured that bone; then taking a course downward, backward, and toward the median line of the body, plunged through the apex of the right lung, emerging from the chest about the third dorsal vertebra, and in contact with the column. Here, meeting the resistance of the skin, and its force nearly spent, it crossed the spine, and lodged under the skin on the left side near the fifth dorsal vertebra, whence it was removed on the field of battle by the



The grape-shot, actual size.

vertebra, whence it was removed on the field of battle by the

brigade-surgeon. The patient says that "there was considerable hæmorrhage" at the time the injury was received, but it does not appear that any secondary hæmorrhage took place during the time he remained in the hospital in New Orleans, which was until the latter part of July, or that any occurred in Brooklyn, N. Y., at which city he arrived August 4th, and remained one month. He then removed to his mother's house in Middletown, Conn., where he became my patient in the early part of September. He had then many of the *rational* signs of advanced phthisis. His emaciation was extreme, he being reduced in weight (as he says) to seventy-five pounds!

He had a constant, harassing cough, excruciating pain through the right side, daily chills and fever, with night-sweats, and profuse expectoration of muco-purulent matter. These symptoms had been present from the first, and, in addition, an exhausting diarrhœa had set in at the time he consulted me. This, however, was fortunately readily checked.

In the way of general treatment, he had before this been upon iron, acids, cod-liver oil, and the like remedies, taking also, constantly, morphia. Learning that, on the voyage from New Orleans, a piece of bone had been discharged from the wound, a careful examination of the whole course of the ball was made. The following points were thereby established:

1. That the track of the ball had become converted into a fistulous canal, having a direct communication with the bronchial tubes, as shown by the fact that air issued freely from both openings of the wound, and that, by closing the nose and mouth, the patient could at will forcibly expel air from them, together with jets of pus.

2. That the two extremities of this fistulous canal had become thickened by the deposition of condensed tissue, and so firmly united to the parietes of the chest as to prevent the escape of air or fluids into the pleural cavity. Pneumothorax existed at first, but the lung, when I first examined him, was not collapsed, and even at that early date (September, 1863) had partially resumed its functions.

3. Fragments of bone could be made out in the course of the ball. One of these was small and quite superficial, near the anterior opening, and was readily removed from under the

clavicle. It was, I think, a portion of that bone. In a direction downward and backward, nearer the posterior than the anterior opening, other fragments could be felt. Now, it should be remembered that, although the ball was cut out from under the skin, on the left side between the fifth and sixth ribs, it emerged from the interior of the chest on the right side near the third dorsal vertebra.

This space, then, constituted a short, subintegumental sinus, the axis of which was nearly at right angles to the track of the ball through the lung. It was necessary to lay open this short sinus, and to dissect back flaps of integument from the posterior opening, before the course of the ball (or true sinus) could be explored. Fragments of bone could then be readily felt embedded in the lung, about three and a half inches from the surface. One piece could be made out longer than the others, standing, as it were, across the track of the ball, and entangled and held in some firm lung-tissue below.

As it seemed certain that the patient's symptoms were due to the constant irritation kept up by these fragments of bone, it was determined to remove them at once, if possible. I found, however, the greatest difficulty in doing this, nor did I succeed until after several attempts. The long piece to which I have alluded was the great source of trouble, as it stood in the way of the extraction of the others. It was somewhat movable up and down, and to and fro, and this very mobility increased the difficulty of dividing it, which I tried to do, several attempts at extracting whole having failed. I found it, however, impossible to get any cutting-forceps with sufficiently strong blades through the opening.

I was unwilling to interfere with either extremity of the sinus in any other way than to enlarge them as much as possible by dilatation of the soft parts, the idea of breaking up, at either end of the sinus, the condition of things so fortunately effected by the natural powers not commending itself favorably to my judgment. The posterior opening was the one to be enlarged, if either; and, while it was very evident that the ball had injured the vertebral column, it was impossible to say *just* what had happened, or *what* might not be the possible result of any disturbance of this part. Very possibly the ar-

mamentarium of a metropolitan surgeon would have supplied what was required to effect easy division of the bone. It is perfectly possible, also, that the orifice by the side of the vertebral column might have been safely enlarged. I do not pretend that the operation which was finally successful was the only one, or the best one, that could have been tried. It was fortunately successful.

One great difficulty in dealing with this case arose from the fact that any manipulation in the wound and disturbance of the fragments caused extreme irritation, expectoration of bloody pus, and such incessant, convulsive cough as compelled a cessation of all attempts at extraction, and gave rise, in the patient's feeble state, to most alarming prostration. Thus, it was necessary to allow an interval of many days to elapse between each attempt at extraction. After consulting with several professional friends, some of whom had assisted at these trials, I found myself obliged to inform the patient and his family that neither I nor those with whom I consulted could suggest any other way of setting free the entangled fragments, than by dividing their attachments within the lung. It was clearly stated that there was the greatest danger in blindly cutting in such a situation, that some large vessel would be wounded, and that, even if this should fortunately not happen, the patient was so excessively reduced in strength as to make it not improbable that he would succumb to the shock. However, with a full understanding of the risk, he, with the concurrence of his family, decided that the operation should be done, and it was accordingly performed in the following manner: The patient (who refused at this time, as always previously, to take any anæsthetic) being seated in a chair, the long-impacted fragment was seized with ordinary dressing-forceps, and firmly held.

Then a slender knife with a blade three inches in length, of which less than a third, at the extremity, had a cutting edge, was passed by the side of the forceps, and used to divide freely the tissues within.

At the same time, by twisting and making traction upon the fragment, its long axis was finally made to coincide with the direction of the sinus, and it was extracted.

Some small remaining bits of bone and shreds of foreign material were then quite readily removed.

As soon as this was done, pus mingled with blood poured in a full stream from the opening, and also welled up into the mouth and nose.

The amount of blood, however, lost at this time was very small, but, a few weeks afterward, the patient having imprudently exposed and over-exerted himself, had two very copious hæmorrhages. The quantity of pus poured out at the time of the operation, and for thirty-six hours afterward, was so great that I believe the removal of the pieces of bone opened a large cavity in the lung filled with it (a sort of pocket, in fact). The patient's condition for several days after the operation was highly critical. He was very feeble, and scarcely able to make the exertion necessary to free the air-passages from pus, and from this cause was more than once in danger of suffocation. In the course of a week, however, the secretion of purulent matter began to diminish sensibly, and in a few days more ceased altogether, giving place to a slight discharge of thin fluid, which continued for some months.

The peculiar convulsive cough, which from the first had been a marked feature in the case, ceased altogether in a very short time after the operation, and there has never since been any return of it. From the time the cough ceased, the convalescence was very rapid, the patient gaining flesh and strength fast, having no drawbacks, save the occurrence twice of hæmoptysis, before stated.

There can be no doubt that the foreign bodies in the lung gave rise to all the symptoms, and that the patient had not only no constitutional disease, but that he is possessed of a wonderful amount of vitality and exceptional recuperative power. The wound remained open for nearly a year from its reception, and a small stick three-eighths of an inch in diameter could be readily thrust through the body without causing him much inconvenience, closing finally in June, 1864. In spite of all remonstrance, he insisted on joining his command, and took an active part in the battles of General Sheridan's campaign in the Shenandoah Valley, in the summer and autumn of 1864.

The fragments of bone removed were unfortunately lost through the carelessness of a servant. They were slender spiculæ, most probably split off from the ribs. The longest of these spiculæ retained its connection with a transverse vertebral process, which had been broken off. It was this fragment which gave so much trouble, the sort of hook formed by the vertebral process readily engaging itself in the tissues, and resisting extraction. The patient is now (November, 1871) in robust health. Eight years since, when able to leave the house for the first time, he weighed (he tells me) "less than eighty pounds." His present weight is "*one hundred and sixty pounds,*" and he has a powerful muscular development. He has a nearly perfect use of the arm of the wounded side, the only exception being a little embarrassment in motions of rotation, as in throwing a stone, for instance.

The most cursory examination of this patient now makes it evident that the ball in its path must have been in the closest proximity to most important structures in the clavicular region at its entrance, and to those of the vertebral column at its exit from the body. The distance, nearly four inches from the walls of the chest, from which the fragments were removed, the downward direction of the sinus, and its clearly-demonstrated free communication with the bronchi, show to what an extent the upper lobe of the right lung must have been involved; and a paralysis more or less complete and persisting for more than six months, of the right arm, makes evident the narrow escape from destruction of the brachial plexus. The present condition of the lungs, as shown by physical signs, is believed to be as follows: The whole left lung normal as far as can be determined. On the right side, anteriorly, above clavicle, total or nearly total absence of respiratory murmur, flatness on percussion, caused by cicatricial induration. Below the clavicle the respiration seems normal, and there is no evidence of induration. Behind, the evidence of induration extends as low down as the lower border of the cicatrix, but the signs are more marked between the spinal column and the inner border of the scapula. Through the whole space, bounded above by the apex of the lung, outwardly by the inner margin of the scapula, below

by the inferior border of the cicatrix, inwardly by the spinal column, there is dulness on percussion, respiration of a bronchial character, and increased vocal resonance. The same symptoms are found in the subscapular region, though not so well marked.

In addition to a rude diagram of the parietes of the chest, to illustrate the path pursued by the grape-shot at its exit, and a woodcut giving actual size of the shot itself, now in my possession, are appended illustrations of the present appearance of the patient's back and chest, from the original photographs. In estimating the accuracy of these representations, it should be remembered that the camera brings out most strongly the deep contracted portions of the cicatrices, and does not indicate well some of the others, and some do not show at all. For instance, in the front view, if one neglects to note the faint lines in the engraving to the inner side of the dark and depressed cavity shown, and which lines are really *cicatrices*, the impression would obtain that the whole extent of the injury in front was much nearer the acromion than it really is. Considering that this patient has rallied from almost the extreme degree of emaciation and asthenia compatible with life, until he now presents such a degree of health and muscular power as, conjoined with a character noted for courage and tenacity, would render him a formidable antagonist at most manly exercises and field-sports, I would present the case to the profession as an additional proof of what we may hope for from the exercise of the reparative and recuperative powers of Nature, provided the nutritive and excretory functions remain unimpaired.

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