

McSHERRY To Dr Wheaton U.S.A.
with respects of
Dr Dunbar

A LECTURE
ON
GUN SHOT WOUNDS:

PREPARED TO BE READ BEFORE

Prof. Dunbar's Private Class.

By RICHARD McSHERRY, A. M., M. D.

Baltimore, February 25th, 1852.

Box

BALTIMORE:
PRINTED AND PUBLISHED BY JOHN MURPHY & CO.
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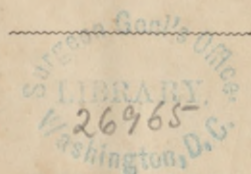
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THIS LECTURE

IS RESPECTFULLY DEDICATED TO THE

Medical Officers of the Army and Navy

OF THE UNITED STATES:

By one who has been much associated with them; and who
always looks back to the association with mingled
feelings of pride and pleasure.

Medical Officers of the Army and Navy

OF THE UNITED STATES

IN introducing this Lecture to the public, it may be as well to state under what circumstances and for what occasion it was prepared. My friend, Dr. JNO. R. W. DUNBAR, of this city, has been for a number of years collecting *matériel* necessary to the thorough instruction of medical students in each and every branch of their profession, until at this time, he has a collection which would do credit to an incorporated medical college. Besides an ample and well selected library, he has a spacious museum of anatomical and pathological specimens; of chemical apparatus; of obstetrical models; and of the various mineral and vegetable preparations pertaining to the *materia medica*.

That these important advantages may be duly appreciated and understood by his students, he gives them frequent lectures, and examinations, in which he is assisted by several associates. The establishment has thus reached the dignity of what may be called a private university—nearly two hundred young men have profited by it, the greater part of whom are now creditable members of the medical fraternity.

Having the care of this INSTITUTE and of a large practice to bear at once, it is not surprising that the Doctor should be pleased to have occasionally in his chair a substitute. He has therefore latterly adopted a plan of inviting from time to time, eminent practitioners of the city, to communicate by lecture to his class, some of the fruits of their experience. In the present

case, he probably allowed himself to be swayed rather by feelings of personal friendship, commenced years ago, during the early studies of the lecturer in his office, than from any hope that the latter could throw any lustre on his course.

The lecture, in fine, without making any particular pretension to novelty or originality, offers as its only claim to merit, the fact that it embodies much in a few pages that is scattered elsewhere through many volumes.

BALTIMORE, *March 1, 1852.*

LECTURE ON GUN SHOT WOUNDS.

GENTLEMEN:

AT the request of my valued friend, your preceptor, I consented to deliver before you a lecture on some subject connected with military surgery; a consent given, I must say, before the objections had been well weighed, of a person's presenting himself in a new capacity, before an audience, now replete with the teachings of practiced masters in the various branches of medical science. The use of the scalpel and the saw have become familiar to me on or near the battle field, yet I confess, the attempt to present my views, or experience, or gleanings in this manner, gives me more embarrassment than ever did the initiatory lessons in the use of the surgeon's knife.

The scope allowed me now, the whole field of military surgery, is too vast to be condensed even to a bird's eye view in a single lecture; I will therefore this evening confine myself principally to a portion of it, which alone, in justice, requires a good sized volume; my subject is the nature, character and treatment of GUN SHOT WOUNDS.

These formidable lesions, in modern war, demand the military surgeon's first consideration; they frequently bring into exercise, at once, the highest efforts of his professional skill, of his physical courage, and of his moral character; it may readily happen, that under the desolating fire of the enemy, he will have to form his decisions and act upon them, without advice or without assistance; his actions must keep pace with his thoughts rather than follow them; and yet, a little rashness or undue precipitancy, may complete a fatal act only commenced by the inimical missile from the ranks of the opposite forces. With this consciousness before him, the military surgeon who had not prepared

himself for the day of his trial, by all practicable means, would deserve unmeasured reprobation; and even if during carnage, his criminal blunders should be overlooked by those around him, an inward and relentless monitor would constantly remind him, that he carried with him affliction and despair, instead of cheering hope, and relief to suffering. It is true, the young surgeon cannot command within himself practical experience, but he may fortify himself with the experience of others, and reduce it to practice when occasion offers; and if perchance, he is sometimes at fault, and his judgment does not serve him truly, he will suffer pain indeed, but with a mind sustained by rectitude of intention, with a knowledge that he filled his lamp with oil before entering upon his arduous duties, he will soon stand erect before the tribunal of his own conscience, and the very errors of his inexperience will be viewed by him, for the future, as beacons of danger, and they will guide him to success.

GUN SHOT WOUNDS may be considered, first, in a general way, as regards their character, appearances, and effects upon the system at large, with the principles of treatment; and afterwards in their relations to the different regions of the body. These accidents have, of course, characters in common with all simpler wounds or solutions of continuity, but they present besides certain complications in loss of substance, contusions and lacerations, peculiar to themselves. In simple incised wounds, men have learned by watching the operations of nature, that art as a general rule has little else to do than to bring the severed edges into apposition, and to retain them there for a time by the most simple mechanical appliances; shortly, the *vis medicatrix* pours forth an agglutinative cement, worth more than all the vulnerary balsams, which in a little time holds the parts firmly together, and leaves behind at length nothing but the smooth, even, beautiful little seam we call a cicatrix. This process of cure is known among surgeons as union by first intention; but it is not thus that gun shot wounds are remedied. When a musket ball passes through living flesh, its course is marked by local death and destruction of tissues; its action at the point of entrance is compared to that of a punch, while its exit is made by rending and tearing. Of course we cannot expect an immediate process of repair where the living tissues have become either lost or disorganized, but we look naturally

for suppuration and sloughing, until the parts which have lost their vitality, which now become irritants as foreign and extraneous bodies, are removed from the system. When this is effected, under favorable circumstances, repair is set up and carried on by that slow process which we call granulation, and thus losses are finally made good by new formation.

We call all wounds made by the stern iron or leaden messengers sent from fire arms, gun shot wounds, and in as much as these missiles vary from ponderous cannon balls to buck or smaller shot ; in as much as the whole person, from the scalp to the plantar integuments, is liable to receive the blow, it is obvious that the degrees and forms of injuries inflicted may be various *ad infinitum*, beyond the possibility of detail ; it is left to the surgeon in each varying form to modify general principles so as to apply to present emergencies. Gun shot wounds like other grave injuries oftentimes produce effects quite different from what is naturally expected under similar or given circumstances ; so that it not unfrequently happens, that partial or entire recoveries happen where all rational prognosis must be unfavorable ; and of which I will give a remarkable instance not of a gun shot wound indeed, but of a similar injury, when speaking of wounds of the head ; while on the other hand, accidents apparently the most trivial, will be followed by fatal results. These exceptional cases sometimes admit of rational explanation, but not always ; it was formerly thought when men were found dead on the battle-field without external injury, that the wind of a ball had caused death, but this view has long been exploded, in as much as soldiers have frequently had portions of their dress carried away by a ball grazing them, while they escaped entirely unhurt. Careful examinations of the dead body, have frequently shown ruptures of vital organs, where there was no visible injury externally ; these accidents are generally effected by spent balls when they have no longer the power to plough their way through the body.

It will readily be understood however, that when the fatal lesion escapes our researches entirely, the nervous centres may have received a shock, the immediate effects of which are too subtle to be brought to light by the dissecting knife. Sometimes a soldier receives a severe wound without even being conscious of it, until informed perhaps by a comrade ; while again, a

slight wound will cause in persons above suspicion of cowardice or fraud, agonizing pain, pallor, prostration, and nervous tremors. These are well known facts which are so wrapped up between moral and physical considerations, that it is often impossible for us to disentangle them.

I will not dwell on the general appearances of gun shot wounds further than to notice a point which may involve medico-legal questions.* I refer to the entrance and exit of balls. We have been uniformly taught that the balls from small arms make round, well defined holes, with edges inverted and blackened, at the entrance, while lacerated, prominent, irregular edges indicate the point of emergence. Careful investigations made in the hospitals of Paris by Roux, Blandin, and other eminent surgeons, have shown that exceptions are at least as numerous as the rule; that very often the point of entrance is found rough, irregular, and more extensive than the point of exit; that very often it is entirely impossible to distinguish one orifice from the other. It is evident that a ball carrying other articles with it, as wadding, buttons, or bits of clothing may make a wound, which will be far from clean cut or well defined. In doubtful cases, the young surgeon will see the necessity of caution in expressing opinions, or forming his diagnosis, from points which were supposed to have been well settled, but which in fact, are far from it.

The treatment of gun shot wounds is now fixed upon rational principles; surgeons do not now trouble themselves, or their patients, with theories of specific poison. Hot oil poured into the wounds, once a famous remedy, is an infliction spared to modern sufferers; scarifications too, are rejected except when used for definite ends. Violent hemorrhages are rare from these wounds except when great vessels are divided; the smaller arteries are generally as much sealed as if touched by the cautery; it is scarcely necessary to say that great hemorrhages must be arrested, *coûte qui coûte*, by compression, by the ligature, or if necessary by removal of the injured part from the body. General dressings are now commonly, cloths wet with cold or warm water, which it shall be at the time, is best indicated to us by the feelings of the patient; lint alone, or soaked in blood, or

* See Am. J. M. Sciences—July 1849.

spread with mild or stimulating ointments, according to the stage of the wound; with adhesive straps, compresses, and rollers, to sustain the injured parts. Before beginning with our dressings, a gentle, careful, and thorough examination must be made of the wound; we take out as far as practicable all foreign matters; so that nature shall have to contend with nothing more than the wound itself. Our operations are the more effectual, the sooner they are made after the reception of the wound, before the parts become tense, swollen, and painful. Our explorations must be made with such discretion, that we do not incur the risk of doing additional damage to vital or important organs, or that we do not subject the patient to unnecessary pain. When we are obliged to give up the search after balls, &c., they will sometimes appear after a lapse of time at some place far distant from their entrance, where they may be more accessible; or where indeed, they may form the nuclei of new diseases, as when, for example, a ball which has lodged in the upper portion of the body finds its way to the bladder and there becomes the nucleus of stone. Several such instances are on record. Balls have sometimes lodged in large bones and have remained there harmless for many years, but more frequently they change position by breaking down the delicate cancelli before them, causing very great irritation, or even the most painful form of abscess in the osseous tissue. To prevent such consequences, the best surgeons recommend that the ball should be removed from bone in the first instance, by the trephine, if necessary, unless special reasons make the operation improper. The surgeon's duty to the patient does not end with the skilful dressing of his wounds; he must see him properly stowed for transportation to the hospital, and there placed in a clean, dry, airy ward for future treatment. Transportation is effected in our army for short distances on hand litters, or else in the *ambulances volantes*, or flying hospitals, light covered wagons on springs, drawn by four horses, as devised by Baron Larrey for the armies of Napoleon. The patient being in the hospital, medical surgery to a considerable extent supersedes operative surgery; many times during the day the watchful eye of the surgeon must rest on the unfortunate men who are entrusted as much to his honor and his sense of duty as to his skill; at the bed-side of one he will find the flagging pulse, the sunken features, and the prostrate, supine position of advanced disease;

exhausted nature is failing under her burden; at another bedside, he will find the hot skin, flushed cheeks, wild rolling eye, and bounding pulse, in which he sees nature lashed into fury in the strong man, by relentless irritation. He takes his steps accordingly; he brings renewed life to the sinking man with cordials; and he turns the heated blood from the brain of the other by withdrawing it from the overladen vessels; and thus he brings the two to the equilibrium which is to restore them to health. Cases which are less urgent, he of course treats with less urgency; by judicious dieting and mild medicines he regulates the digestive functions, for he knows well that any derangement in them is accompanied, or followed by equivalent disorders of wounds. Hennen well says that he could often foretell unfavorable changes in wounds by the headache, furred tongue, and costive bowels of the patient. These of course then, give indications to the surgeon which are not to be neglected.

Let us now pass from general views to the effects of gun shot wounds on the various regions or organs of the body, beginning at the head, and going downward in order. It is the remark of an eminent surgeon* that "no injury of the head is too slight to be despised, or too severe to be despaired of." Numerous instances attest that superficial and apparently trivial injuries of this important region have been followed by results the most unfavorable; commonly however, from secondary causes. A slight contusion of the scalp may be followed by a most intractable form of erysipelas, particularly if the sufferer is a man of dissipated habits, of broken constitution, or if he is lodged in a crowded, ill ventilated apartment, or if he is exposed to contagion, or other causes, appreciable or inappreciable; or the injury may result in exfoliation of the cranial bones, or in inflammation of the meninges of the brain, or of this organ itself, or in some other way, which, whether fatal or not, may place the life of the patient in great jeopardy. On the other hand, I will present to you one or more instances of most formidable wounds which have been followed by recovery. Military surgeons record various cases of balls extracted from the substance of the brain with successful results. I select for illustration, case No. XL, from Hennen. He tells us his attention was called

* Liston.

to a wounded French soldier, who had lain for three days on the field without tasting food of any description, and without any attention having been paid to his wound. "A musket ball had entered at the anterior portion of the squamous suture of the right temporal bone, and, passing backwards and downwards, fractured in its course the parietal bone and lodged itself in the substance of the brain." He had slight headache and partial deafness of the right ear; there was considerable tumefaction of the soft parts about the entrance of the wound, but his general condition was promising. The following morning, "The wound was laid freely open, when three large and several small pieces of bone were removed; and the ball, which was found lodged in the posterior lobe of the right hemisphere of the brain where it rests on the tentorium, was extracted without difficulty, and with small portions of the substance of the brain adhering to it."

The wound was cleansed; the edges were brought together and lightly dressed, two ligatures were applied, and compresses, adhesive straps, and bandages gave the parts support. His head was kept constantly wet with cold water, the lightest diet, with a little fruit, was enjoined and a daily laxative was administered; a moderate, healthy suppuration proceeded from the wound, and the man did remarkably well except on two occasions, when injudicious kindness on the part of his comrades very nearly cost him his life. His laxative was omitted, and wine, eggs and other extras supplied him, which immediately caused great and dangerous irritation in the system; but a brisk cathartic administered by Dr. Hennen; afterwards a diaphoretic mixture, "with a rigid adherence to his former mode of treatment soon restored him to his previous state of convalescence." I may here say, that his diet consisted of a small allowance of bread, with water whitened with milk and sweetened with sugar. His recovery was complete. During the progress of it, he was allowed to smoke tobacco as usual, in as much as no bad effects were observed from it, and as he declared that without it he could not resist the urgent cravings of his appetite.

I have referred to a formidable accident to the head which bears sufficient resemblance to a gun shot wound to merit a passing notice here; if it had occurred within my own experience, I would scarcely venture to relate it, unless sustained by un-

questionable evidence, but the vouchers in the case are so strong that no one can doubt but that the facts are truly stated. On the 13th of September, 1848, a person named Gage was employed in blasting rocks on the line of the Rutland and Burlington Rail Road. He was engaged at the time in charging a blast; the powder was poured in, and his assistant was directed, according to custom, to cover the powder with sand. Gage held in his hands an iron rammer weighing more than thirteen pounds and about $3\frac{1}{2}$ feet in length, which was made by a special order of his, of tapering or conical form. He incautiously commenced to ram down before the sand had covered the powder; the iron struck fire from the rock, "the uncovered powder was ignited and the explosion took place. Mr. Gage was at this time standing above the hole, leaning forward with his face slightly averted; and the bar of iron was projected directly upwards in a line of its axis, passing completely through his head and high into the air. The wound thus received was oblique, traversing the cranium in a straight line from the angle of the lower jaw on one side to the centre of the frontal bone above, near the sagittal suture where the missile emerged, and the iron thus forcibly thrown into the air was picked up at a distance of some rods from the patient, smeared with brains and blood.

"From this extraordinary lesion, the patient has quite recovered in his faculties of mind and body, with the loss only of the sight of the injured eye."

The treatment, in general terms, consisted of shaving the head, cleansing the wound, adhesive straps, light dressings, and cold lotions; laxatives and purges; general venesection once during high fever from premature exposure, antimonials; and of course, rigid low diet. Pus of varying character was freely discharged; fungi sprouted from the brain and orbit, which were repressed by the use of crystallized nitrate of silver. The treatment throughout by Dr. Harlow, of Vermont, was simple, judicious, and appropriate. An able report of the case was drawn up by Prof. Bigelow, of Boston, who took a common skull in which he made apertures corresponding to those in Gage's head sufficiently large to pass the iron; he says, "It is obvious that a considerable portion of the brain must have been carried away; that while a portion of its lateral substance may have remained intact, the whole central part of the anterior lobe, and the front

of the sphenoidal or middle lobe, must have been lacerated and destroyed. This loss of substance would also lay open the anterior extremity of the left lateral ventricle; and the iron, in emerging from above must have largely impinged upon the right cerebral lobe, lacerating the falx and the longitudinal sinus. Yet the optic nerve remained unbroken in the narrow interval between the iron and the inner wall of the orbit. The eye forcibly thrust forward at the moment of the passage, might have again receded into its socket, from which it was again somewhat protuded during the subsequent inflammation.

“It is fair to suppose that the polished conical extremity of the iron, which first entered the cavity of the cranium, prepared the passage for the thick cylindrical bar which followed; and that the point in reaching, and largely breaking open the vault of the cranium, afforded an ample egress for the cerebral substance, thus preventing compression of the remainder.”

The details of this case may be found in full in the *American Journal of Medical Sciences* for July, 1850.

We must class this case among the most wonderful records of surgery; yet it is not entirely without parallel. **“Ambrose Paré gives us the case of Francis of Lorraine, Duke of Guise, who was wounded before Boulogne by a lance which struck him above the right eye, inclining towards the nose, and which entered and passed through on the other side between the neck and the ear with such violence, that the head of the lance and a great part of the wood were broken, and remained in, and could not be removed without the aid of a farrier’s pincers. Notwithstanding all this violence, which was not done without breaking of bones, nerves, and arteries, and other parts, my said lord, says Paré, by the help of God, was cured.”*

I have cited these few remarkable cases out of a great many, gentlemen, to show that even in the most desperate cases, the surgeon is not at liberty to abandon his patient; he must stand by him to the last, hoping against hope, it may be, yet once in a life-time, he may be rewarded by seeing his patient rise almost from the grave under his skilful and diligent ministrings. On the other hand, let him not forget, that “no injury of the head is too slight to be despised;” the number unfortunately of fatal

* See Hennen’s *Principles Milit. Surg.* P. 230.

results from slight wounds vastly exceeds recoveries from those which are severe.

I cannot dwell longer on wounds of the head—the outlines of treatment have already been sketched with the cases; as for other results of these wounds, as compression, concussion, &c., they must be considered as belonging to the general domains of surgery, not requiring special notice here.

I will pass rapidly over wounds of the face which are often in their effects more disfiguring than dangerous; the surgeon should endeavor to prevent deformity as far as consistent with the safety of his patient by bringing about early reunion of the divided parts, and preventing prolonged suppuration. Wounds of the parotid duct often give much trouble from allowing a constant dribbling of saliva over the cheek; it is difficult to restore the flow to its original channel; Hennen suggests a clean incision through the cheek, after which the external wound may be healed by keeping the edges in contact, and the occasional use of nitrate of silver, while the internal incision shall be left exposed to the passage of the saliva. I would suppose that in some cases a silver style, or tubule, might be introduced and worn to advantage.

Gun shot wounds of the neck and throat are among the most formidable in surgery; the cervical portion of the spinal column, various important nerves, the carotid arteries, the jugular veins, the larynx, trachea, and œsophagus, present themselves at once to the mind's eye of the surgeon, and indicate to him how much he has to dread from any serious injuries in this important region. If any of the great vessels are torn he may apprehend immediate death from hemorrhage; ruptures of small vessels near the larynx or trachea may cause suffocation; general or partial paralysis will result from injuries of the spine, or the important nerves which traverse the neck to supply the diaphragm, or the most important viscera; or of those which control the upper extremities. As a general rule, the division of the carotids and jugulars is fatal, but compression and the ligature have saved many valuable lives under the most unpromising circumstances. It is recommended in such cases to take up both ends of the divided vessels; from their great size, and numerous sources of supply, the propriety of so doing is obvious. During the treatment of wounds of the wind-pipe or œsophagus, I must

call your attention to a practical hint of Hennen's, which is to avoid antimonials, or other remedies during febrile excitement, likely to induce the effort of vomiting. After proper blood letting, the free use of a solution of nitre in lemonade would be quite appropriate if the patient could be allowed to swallow; fluids have to be introduced often through tubes inserted into the stomach, or when this is not admissible, we must resort to enemata, not only for medicinal purposes, but also to supply nourishment.

We come now, gentlemen, to the consideration of wounds of the thorax. If the brain, the heart and the lungs form, as it is said, the tripod of life, we have in this region two-thirds of mortal existence liable to be impaired or destroyed, and demanding of us the highest efforts of our skill. The beautiful frame work of bone which encloses the important organs of the chest, is so arranged as to yield to all the necessary motions of the body while at the same time it gives a sufficiently firm protection against ordinary, and to some extent, extraordinary injuries. Thus a ball, aimed directly at the heart, may be so turned by the ribs as to pass out of the body directly opposite to its point of entrance, appearing to have traversed the cavity of the chest, into which in fact, it did not enter. A red or dusky line in the skin marking its course, with the absence of alarming symptoms, gives us early assurance that the tripod happily remains unscathed. This is a "hair-breadth 'scape" which is by no means uncommon. If unfortunately the barrier is inefficient and the heart is really impinged, or the great vessels arising from, or entering into it, we may commend the patient to the only Power capable of giving him relief. It is true, that in the whole history of surgery there are a few exceptional cases recorded, where the patients are said to have recovered, but the fatality is uniformly so great and so immediate, that there is no rational ground left upon which to base a hope. Indeed the surgeon rarely finds his patient alive, however prompt may be his attendance.

Wounds of the lungs are of the deepest interest to the surgeon. Hope and fear here meet almost on equal grounds; we are called to a man whose pallid features, staring eyes, painful, impeded respiration, cold skin bathed in a clammy sweat, and feeble pulse indicate to us, dreadful injury and imminent danger.

When we find, moreover, bright, frothy, florid blood, brought from the mouth with a labored cough, we think at once, of

“The gashed stabs looking like a breach in nature,
For Ruin’s wasteful entrance.”

We probably find our wounded man weltering in his own gore. Generally possessed of his faculties he turns his appealing eyes to the surgeon with a moving eloquence that no words can equal; they seem to say, under God, I look upon you as the arbiter of my destiny, can you, will you restore me yet to life? We answer in good faith, with the cheering words of hope, while we examine the extent of his injuries. If foreign matters are lodged in the lungs, we make an immediate effort to remove them by the finger or the forceps; when the attempt is successful a great point is gained. If the patient is threatened with suffocation we must draw blood freely from the arm. We place light dressings on the wound and we bind up the chest in a broad, firm, sustaining bandage, for the purpose of keeping the parts as much at rest as possible. Every hour now gained to the patient’s life serves to encourage us, but still we have to fear from gun shot wounds especially, secondary hemorrhages, following sloughs; or violent inflammatory reaction. If the flow of blood occurs within the pulmonary substance, we restrain it as far as may be, by general antiphlogistic measures; if from the intercostal arteries, we trust principally to direct pressure. I know of no more ingenious or effectual mode of making pressure than thrusting a bit of linen through the wound so folded as to make a small sack, this is to be stuffed with charpie until it forms a button-like protuberance; it is then drawn firmly outwards until it compresses closely the bleeding vessel.* Sometimes continuous pressure has to be made for many hours by the fingers of assistants.

We may have to contend with empyema, or emphysema, or pleuritis or pneumonia, singly or combined; as a general rule, the patient remains for life more subject to diseases of the chest than before his injury; sometimes the reverse obtains, but such cases are exceptional. During the progress of cure we must carefully watch the first risings of active inflammatory symptoms; general blood letting, antimonials and rigid diet are urgently demanded. When long continued and exhausting suppurations

*Liston.

follow inflammation, we are obliged cautiously to increase the patient's food in quality and quantity; it is to be feared that the neglect of this consideration has cost many valuable lives. Here, as in all other cases, the surgeon must adopt a rational practice; he knows that a full diet during active inflammation is adding fuel to flame; let him not forget on the other hand, that exhausted nature calls, in low but earnest tones, for sustenance.

Balls which enter the cavity of the chest do not always traverse the organs; they sometimes follow the concavity of the ribs, leaving a contused and seared trace upon the lungs and costal pleura. These cases are not easily distinguished during life, a matter of little moment however, as the treatment is the same. When the lungs have been entered, and the patient has fortunately recovered, internal fistulae and cicatrices remain much resembling those described by the profound pathologist who taught the world, in diseases of the chest, the value of physical signs. Laennec found in many cases of excavation of the lungs left from discharged vomicae, cellular or fibrous or fibro-cartilagiuous layers which had formed over the ulcerous surfaces and healed them; similar appearances have been found following wounds. There is now in the Senate of the United States an honorable and active member, wounded through the lungs at the battle of Cerro Gordo, now nearly five years ago, who no doubt carries within him an extensive specimen of this kind of repair. I allude to Gen. Shields. A grape shot of the size of a walnut "entered the right breast just under the nipple, and passed out on the same side close to the spine, breaking two ribs." He was carried two miles on his back in a blanket; the blood poured copiously out of the wound, so that there was but little hemorrhage from the mouth. He was reported mortally wounded, but the great hemorrhage probably saved his life. I saw him some months later, battling again under his adopted flag, before any hue of blood was yet restored to his pallid features. Among the desperate cases recorded in military surgery, is one, in which a ball struck a soldier's breast-plate, doubled it up like a candle extinguisher, and passed thus rolled up in it through the lung. The man lived for several weeks improving daily, and his death at last, appeared to be fairly attributable to his own folly.* I do not narrate these cases to mislead you with false hopes, or to underrate the great dangers

* Hennen.

of wounds of the lungs, but rather to serve to encourage your diligent attentions in similar cases. We are told indeed that traumatic inflammations of these organs are less dangerous than the idiopathic inflammations.* I am not prepared to admit or deny the assertion.

Wounds of the abdomen come next in order, and will now engage our attention. You may remember that of old, there was a conspiracy against this important region, which was considered a mere idle consumer of the labors of others; the members therefore refused to contribute to its support, until they found by their own decay, that it had in fact never fail to reward their services. Warned by this famous illustration we will not undervalue it now; if indeed the abdomen has not the honor to enclose any portion of the tripod, it at least does something to sustain it; so much, that to do it serious damage, is to break the pedestal upon which the tripod rests. Turn your thoughts for a moment to the great vessels and nerves, to the liver, spleen, stomach, bowels, kidneys, bladder, and other organs contained in this great cavity, to the delicate and sensitive membrane which embraces them in its folds, and you will see at once the complex dangers which are liable to ensue from any foreign invasion. Great fatality attends serious wounds of this region, although here too, as elsewhere, many escapes, almost miraculous, are recorded. Sometimes a mere external bruise proves fatal, most commonly by causing peritoneal inflammation; while again deep injuries are, though rarely, followed by recovery. Destructive hemorrhages usually follow injuries of the liver or spleen; violent inflammations result from those lesions of the stomach or bowels, or kidneys and bladder, which cause effusion of their contents. Such effusions leave us little hope; they are shown by deadly "sickness, rigors, quick weak and indistinct pulse, most excruciating pain, a sense of heat diffused all over the abdomen, and rapid sinking of the powers of life;" we see perhaps passing from the wound fecal matters, bile, or urine, while the alvine evacuations are mixed into blood. The surgeon cannot give much active assistance to these cases; where he finds a protusion of the bowels he may cleanse them carefully, smear them with oil and return them gently within the cavity; if he finds a partial division of them readily within his reach, it is customary to take one or more stitches through the abdominal

* Am. J. M. S. from Gaz. des Hopitaux, July, 1849.

parietes and the bowel, so as to keep the divided portion at the external orifice, with the serous surfaces in apposition. Thus artificial anus is formed, which under the most favorable circumstances, may finally close and allow the contents of the bowel to take their natural course. During the treatment the necessity of avoiding purgative medicines is obvious; the newly formed or forming adhesions demand absolute rest until consolidation is effected. We give the patient the lightest nourishment in the least quantities; we hold the lancet ever in readiness to subdue inflammation. When it is indispensable to open the bowels we use mild enemata. We use light and simple dressings externally, soothing the parts when necessary with warm fomentations. You are aware that some cases of perforations of the bowel by ulcerations during protracted disease, have been saved by keeping the patient for weeks under the influence of opium; the same mode of practice might be adopted by surgeons, in cases having conditions somewhat analogous. Unfortunately, very few of these cases give us time to try what might be done; yet there are now, living and healthy men, who have passed balls *per anum* which had entered the intestines by perforation. You are all familiar with the case of Martin, the Canadian, upon whose open stomach, Dr. Beaumont, of the army, made his famous experiments on the physiology of digestion. This man lived for several years after his wound, which left a valvular opening into the stomach, through which its operations were readily observed.

I shall only say of wounds of the pelvic viscera, where the bladder is involved, it is necessary to make free use of the catheter, to prevent accumulation and effusion of urine.

We now gentlemen, will take up the subject of wounds of the upper and lower extremities, and we have before us the much vexed question of amputation. Hitherto the rapid outline sketches I have presented to you of the management of the injuries we have considered accord with the experience of the profession at large; they offer few points for dissent or argument; not so now; the surgeon here ceases to be the gentle minister of nature; he takes upon himself a solemn arbitration between life and limb. When you reflect, gentlemen, that he has to pass between two fires, upon his own judgment, and his conscience, you see at once how sorely he is tried. If he makes an unnecessary sacrifice of a limb, an arm or a leg, and

thus mutilates a fellow-creature for life, does he not lay up for himself the gall and wormwood of self-reproach? If on the other hand he hears the muffled drum passing mournfully under his windows, preceding the escort that carries a man to his grave, with his shattered limb still appended to the body; and if the thought strikes him, this man might be living now but for my timidity or my theories—do you think that the sound of the drum, and the volleys over the grave are music in his ears? And yet, gentlemen, the surgeon must make his decisions, there is no evasion and, often, no temporizing. He has to shape his course with these horrid thoughts, like grim spectres, staring him in the face. His own experience may be small, and what has he learned from authorities? Military writers almost uniformly direct, that where a limb is seriously wounded with a complication of fracture, to save the life of the patient, it must be removed. Then arises a question, at what period shall the operation be performed, by primary or secondary amputation.

We have now a fruitful field for discussion; the advocates for the secondary operation say, that time shows conclusively the limb cannot be saved; that by a compromise with nature, a trial has been made whether or not life and limb could both be preserved, in case this may not be, then, the limb is sacrificed to the life. This is a mode of reasoning so plausible at least, that the mind must be arrested by it; yet the facts collected by practical experience do not appear to sustain it. By the time secondary amputations are deemed indispensable, the patient is commonly worn down with suffering; he has lost the vigor of health and the firmness of tone which he retained up to some period after the reception of the wound. He is much less able to bear up under the shock of so great an operation, and it is by no means uncommon for him to die under the knife. During the primary operation we have rarely cause to apprehend immediate dissolution; and we know that a good, clean, stump does not cause the perpetual irritation that a crushed and mangled limb does. By primary amputation, we understand of course, the operation as soon as the system has recovered from the first shock of the wound. The young surgeon should never so far forget his first principles as to neglect this consideration. When a man is overwhelmed by his injury, the surgeon may with equal ease hurry him out of life, or for the time, restore him. This he does by the appropriate administration of stim-

ulants. An army surgeon asked an acquaintance of mine on his examination, where he would get his stimulants, his wine or brandy on the field: He answered promptly, and satisfactorily, that he would carry it in a flask about his person. I may say here, it is to be hoped that the proverbial antipathy of the doctor to his own physic would abide by him; for he has all need of his faculties unclouded.

I have given you a summary of the arguments for and against primary and secondary amputations; the subject is really very intricate, and is far from being settled. But are we to follow the rule of amputation as laid down by most military surgeons? Here is a question yet more profound, yet more intricate. And there is still another ground of question, which narrows down the necessity of amputations to the most desperate cases; which in fact brings us to the expectant practice pursued in other regions of the body. The army surgeon is frequently impelled by a consideration which does not obtain elsewhere; that is, that his patient is liable to be transported from one place to another, in such a manner, that no fixtures could keep his mangled limb at ease, nor save him from the risk of additional contusion or hemorrhage; while with a well dressed stump his transportation might be effected with ease and safety. Operations are thus demanded on the march, which could not be justified under other circumstances. But independent of all remote or secondary considerations, what are the absolute conditions demanding the removal of a limb? We have certain rules, supposed to be established, which have been much shaken by close and recent investigations. All wounds involving complicated fractures of the extremities, especially of the large joints, are said to demand amputation. Now let us ask how far amputations succeed in saving life. M. Malgaigne drew up a list of the amputations performed in the hospitals of Paris for traumatic lesions during a period of ten years—from 1836 to 1846. There were 165 amputations performed on men, out of which number 107 were fatal.

A table of subdivision gives us, of the

Thigh, . . .	44	Amputations,	34	Deaths,	over three-fourths.
Leg, . . .	67	do.	42	do.	nearly two-thirds
Foot, . . .	8	do.	5	do.	over one-half.
Shoulder, . .	7	do.	7	do.	
Arm. . . .	29	do.	17	do.	nearly two-thirds.
Fore-arm, . .	10	do.	2	do.	one-fifth.

Thus we find a mortality of about two-thirds after amputation, under average circumstances.

Concerning amputations of the thigh or leg, M. Malgaigne informs us that "in 1830, Dupuytren had under his care 13 fractures of the thigh in which he did not operate; 5 cases cured, 7 died; another was operated on at a later period, and proved fatal.

"In fractures of the knee or leg, Dupuytren performed 5 primary amputations of the thigh, 3 patients died; 4 secondary amputations, 4 deaths.

"For the other fractures of the leg in which the same surgeon did not amputate, 14 were fractures of both bones, 8 died; 2 of the tibia, 1 death; 2 of the fibula, 1 death. He performed two primary amputations of the leg; both cases terminated fatally.

Malgaigne gives the following table of his own cases in which he refrained from amputation:

5 fractures of thigh,	2 recovered,	2 deaths,	1 sec. amp.
6 do. leg,	2 doing well,	4 do.	
2 do. tibia,	2 do.		
4 do. fibula,	2 do.	2 do.	
3 do. arm,	1 recovered,	2 do.	
5 do. fore-arm,	5 do.		
2 do. metacarpus,	1 doing well,	1 do.	Results

of 27 cases: there were 15 recov'd & 12 deaths, presenting a favorable contrast with the amputation table.

Let me arrest your attention for a moment on fractures of the thigh; the above table shows a mortality of three-fifths; the amputation table of over two-thirds; but I fear these results are favorable far beyond the average. During the battles of the valley of Mexico, many amputations of the thigh were performed by myself and others; only two of my own cases came subsequently under my cognizance, both were fatal; but I did not see or hear of one successful case, whether the operation was primary or secondary. The fatality was so great from these wounds, with or without amputation, that an impression began to get abroad in the army, that the Mexicans used poisoned balls, or copper balls for the purpose of causing poisoned wounds; but in fact they lost arms and ammunition so fast, that they were forced to run old bells into grape and canister shot; you are aware that bell metal is a composition of copper and tin, with a

slight admixture of brass, zinc, or silver. There is no reason to suppose that these balls communicated any specific poison, for our other wounds did as well as any recorded elsewhere. Now hear the language of other surgeons:—"Out of 4,000 invalided soldiers" said M. Ribes, "he found not one single case of injury of the femur by shot. This was a proof in his opinion, that all the men who had suffered from such wounds had died." On the other hand, he had not in all these cases found one of amputation of the thigh, a fact from which Malgaigne draws the inference that the fatality is equal, with or without operation. Malgaigne also informs us, that in the "Polish campaign he had lost all the cases of amputation performed upon the thigh after gun shot wounds." These are startling facts, and the conclusion which has been drawn from them merits the deepest attention, viz, "that in attempting to preserve the limbs of the wounded, the surgeon does not cause them to incur any greater risks than if amputation were performed."*

We are told that in gun shot wounds of the knee or hip joints, the operation is absolutely unavoidable. You will excuse my citing a case here, recently reported of recovery after a severe wound of the knee, which may be viewed rather as a commentary on the statement than a denial of it. "A musket ball passed obliquely through the patella of one of Hays' Rangers at Monterey, fractured it, and came out on the inside of the joint. Considerable inflammation ensued which subsided with moderate suppuration, and great care was taken to keep the pieces of the broken patella in place immediately on the subsidence of the inflammation. Discharged service, November 2d. "I met him" says Surgeon Porter, who treated and reported the case; "at Vera Cruz, in the Autumn of 1847; his leg was quite well and useful, no stiffness of the joint, and but little deformity." Dr. Porter also reports another case of direct application here, of recovery with preservation of the limb, where the neck of the femur was fractured by a musket ball, which entered above the right trochanter major, passed out above the lesser trochanter, and thence through the scrotum. Debility from loss of blood, and nervous prostration, demanded stimulants and tonics rather than depletion during the treatment. During slight fever, blue mass and quinine were given together,

* See Am. Jour. Med. Sciences, October, 1848.

and followed by castor oil, in the absence of fever and during suppuration, the quinine was continued with generous diet, and wine; and morphia, *pro re nata*. "The patient recovered so as to be discharged from service on the 15th of January, 1848, (having been about 23 weeks under treatment.) At the time of the discharge the limb was shortened $2\frac{1}{2}$ inches." For these and many other interesting cases reported by Dr. Porter, I refer you to the January number of the American Journal of the Medical sciences.

I will not discuss now the different modes of amputation, nor the use of anæsthetic agents, nor many other subjects necessary to the knowledge of every surgeon; my aim is rather to call your attention to the principles which should govern your actions, than to describe these actions in detail. The surgeon finds himself involved in moral as well as professional considerations, and there are times, when the conscience may avail more than the judgment. When called to a fellow-creature seriously wounded, let him recall to his mind the best lights his professional knowledge can throw upon the case, then let him say to himself, were I in the position of this man what would I wish done on my own person? I know of no means which will be more likely to lead him to do justice to the sufferer before him. His judgment is at best finite and human, and it must be governed by rational probabilities.

Before leaving the subject of amputations, I must offer the following table of wounded of different nations treated in Paris with the comments.

The mortality was, for French soldiers	1	out of	7
Prussian	" 1	" "	9
Austrian	" 1	" "	11
Russian	" 1	" "	27

This marvellous statement is accounted for by saying that the Russians were allowed daily a certain quantity of meat, bread, vegetables, wine and brandy, while the others were submitted to a rigid regimen. You may draw the inference.*

In another portion of this lecture, I have said that scarifications and incisions were no longer used in gun shot wounds except for special purposes, such as the necessary removal of foreign matters, or spiculæ, or fragments of bone, keeping up

* See note at the end of the Lecture.

prolonged irritation; there is another condition requiring incisions equally, but not so conspicuously, which is therefore sometimes overlooked. I mean where there is an effusion of pus under deep fasciæ. As the purulent fluid cannot well escape, it causes extensive burrowing sinuses, with destruction of the intermuscular areolar tissue; the muscles become contracted, and at length by an effusion of lymph, consolidated into one firm, unyielding mass. I have seen myself, a soldier with his leg drawn nearly at a right angle with his thigh and perfectly inflexible, caused by this condition of things after a flesh wound of the thigh. I think it highly probable, that a deep and early incision through the fascia would have prevented this misfortune.

I will not trespass further on your patience, gentlemen, however much may remain that should be said; I have shown you as it were, through a telescope, the military surgeon engrossed in his bloody work, rendering his humane but painful services to the afflicted. He should, and he often does stand among them, as their counsellor, their protector and friend; he sometimes remains by them alone, when the triumphant army is revelling in the spoils of newly captured cities. Removed from all direct mercenary considerations, he is actuated in the performance of his duties by the nobler impulses; whether by the love of fame, or of science, or of humanity. The laurel wreath of the conqueror adorns not his brows, but the successful chieftain himself does not forget to give him his meed of tribute. The Baron Larrey was great without the encomiums of Napoleon, yet so long as the history of latter will be read, the name of the former will be adorned with the proud title of the "most upright man in the world." And who does not cherish the memory of the brave Desgenettes, the chief physician to the forces in Egypt and Syria. When the raging plague spread a panic through troops that had never shown fear, it was his bold heart that restored their courage; he inoculated himself in the presence of the army with the virus of a plague bubo, to show that it was not contagious. It was he who dared to reprove his general when desired to give opium to put an end to the sufferings of the dying men at Acre; he answered simply, sublimely we may say, "my duty is to save," (*mon devoir, à moi, c'est de conserver.*) Napoleon treasured this bold reply to the day

of his death, and it no doubt effected a change in his moral perceptions; in the case of his friend General Duroc, subsequently, when, with his bowels torn out, and suffering agonies of pain, he desired Bonaparte to have an end put to his existence, the reply was "I pity you my friend, but there is no remedy, it is necessary to suffer to the last."

I offer no apology, gentlemen, for the defects of this lecture, I know you may say justly, that many material points have been touched too lightly, and many, omitted altogether; it is even so—I plead guilty, saying only in extenuation, that nothing short of the **BLACK ART**, which is the natural enemy of our, can succeed in putting a gallon of contents into a quart measure.

NOTE.—It cannot cause any confusion of ideas to the experienced surgeon, that the author commends apparently the stimulating allowances made to the Russians equally with such diet, as "a little bread, with water whitened with milk and sweetened with sugar." The student may not understand the matter so clearly, and it is even to be feared that many times our best practitioners do not draw accurate lines as to the time for depletion or stimulation. When any great vital organs are seriously wounded, we can scarcely suppose the necessity or propriety of stimuli (unless occasionally for a transient object); the patient if he is to recover, will generally be convalescent, not only before they are needed, but before they are admissible; in wounds of the brain, for example, we must change the "water whitened with milk" with great caution to milk itself, as bland and mild as is this fluid. Our well informed medical men do not often err in enforcing low diet in proper cases; but they do not always allow their patients the full benefit of stimulants when needed. I may say for myself, that with my present views, I would use stimulants and tonics much more freely in wounds of the extremities, particularly of the lower extremities, than I did during my service under General Scott. When, and in what manner, it may be asked? I reply in such manner as to "obviate the tendency to death." Every varying change in the patient should be watched, and from the first indication of *sinking*, he should be roused by stimuli; he should not die by *asthenia* if wine, brandy, beef tea, or quinine, separately or combined, would maintain his heart's action. Dr. Porter's very notable case of fracture of the neck of the femur with recovery, is a strong illustration of the propriety of the sustaining practice.

Not wishing to trust to my memory in an important case recorded in the lecture, I addressed a letter to the distinguished subject of it, MAJ. GEN'L JAMES SHIELDS, late of the army of the U. S., and now of the Senate. I give the following straightforward, unvarnished, and soldier-like extract from the reply.

"A grape shot entered the right breast just below the nipple, and passed out on the same side close to the spine, breaking two ribs. The blood poured out of the wound as I lay on my back until nothing remained but what was just enough to keep me alive.—I had but very little hemorrhage at the mouth, owing I suppose to the position in which I was carried, on my back on a blanket two miles—and to the size of the wound which gave a free passage to the blood. You saw me when I had nearly recovered, and you can judge from my appearance when you saw me as to my condition when I was wounded."

