

ARROW WOUNDS.

The illustrious Baron Percy was wont to declare* that military surgery had its origin in the treatment of wounds inflicted by darts and arrows, and used to quote his favorite poet† in behalf of his belief, and to cite Chiron, and Machaon's patients, Menelaus and Philoctetes, and Eurypiles treated by Patroclus. He was even tempted to believe, with Sextus,‡ that the name *ιατρος*, *medicus*, was derived from *ιδος*, which anciently signified *sagitta*, and that the earliest function of our surgical predecessors was the extraction of arrows and darts. An instrument called *belulcum*, from *βέλος*, *telum*, a dart, was invented during the long Peloponnesian war (B. C. 431, 405). It was a rude pincers or extracting forceps, and was used by Hippocrates in the many campaigns in which he served. His immediate successor, Diocles, invented a complicated instrument for extracting foreign bodies, called *graphiscos*, and consisting of a canula with hooks.¶ It was not until the wars of Augustus that Heras of Cappadocia designed the famous duck-bill forceps, which, with every conceivable modification, has continued in use to our time. Celsus § instructs us that, in extracting arrow-heads, the entrance wound should be dilated, the barb of the arrow-head crushed by strong pliers, or protected between the grooves of a split reed, and thus withdrawn without laceration of the soft parts. Paulus Ægineta ¶ also treated fully of arrow-wounds, and described an *atracton* used in his day to remove firmly impacted arrows. Albucasis and the Arabian school did little or nothing toward advancing our knowledge of the means of extracting foreign bodies. After the fourteenth century the attention of surgeons was directed to wounds from projectiles impelled by gunpowder. Yet the use of bows and arrows in warfare continued, and we find Paré treating of this class of injuries with the sovereign good sense that characterized all he wrote. As the use of fire-arms became prevalent, the literature of arrow-wounds became meagre, and the subject is now rarely referred to in systematic works. The considerable number of cases reported by our medical officers possess therefore the greater interest.

Multiple Arrow-Wounds.—Dr. Bill, who has printed an interesting essay ** on this subject, remarking upon the rapidity with which the American Indians discharge their arrows, states that it is exceptional to meet with a single wound; that if one arrow takes effect it is immediately followed by two or more others. Of the seven following cases, six were fatal:

CCCLI.—*Report of a Case of Three Wounds from Arrows.* By C. C. GRAY, Surgeon, U. S. A.

Private William Imbler, Co. H, 31st Infantry, while a few hundred yards from camp, at Fort Stevenson, Dakota Territory, on October 10, 1867, was severely wounded by Indian arrows, one of

* Manuel du Chirurgien d'Armée, p. 4.

† Homer, Iliad, Book XI.

‡ Sextus, Advers. Math., Lib. I, cap. 2.

¶ See Andrea della Croce, Lib. 7, p. 173; Venet. 1574.

§ Celsus, De Medicina, Lib. VII, cap. V.

¶ Paulus Ægineta, De re Medica, Lib. VI, cap. 88.

** Bill, American Journal of the Medical Sciences, Vol. XLIV, p. 365.

which was extracted at the angle of the jaw, after it had entered above the left scapula and transfixed the left posterior triangle of the neck. A second passed through the fleshy portion of the right fore-arm; and a third pierced the ulnar side of the left fore-arm near the elbow-joint, and, becoming twisted and wedged in the interosseous space, severely lacerated the tissues. With some difficulty the distorted head of this arrow was pushed downward and extracted near the wrist. The wounds were treated with simple dressings. Save partial paralysis of the left hand, the patient did well.

CCCCLII.—*Report of Death from Multiple Wounds, most of which were from Arrows.* By W. H. SMITH, M. D., Acting Assistant Surgeon.

Private Robert Nix, Co. G, 14th Infantry, was wounded near Camp Lincoln, Arizona Territory, in October, 1868. He received a gunshot flesh-wound in the upper portion of left arm; a slight cut from an arrow in the left ear; two flesh-wounds from arrows, from one of which the hæmorrhage was profuse; two arrow wounds in the right knee, the synovial membrane having been penetrated, but no bones broken; one gunshot wound in the right elbow, but not through the joint; and another through the metacarpal bone of the third finger of the right hand. During the eight hours following, while being conveyed to camp, he became very weak from loss of blood, and riding part of the time on a horse with a comrade, and the remainder in a Government team. He suddenly died the next morning. Decided symptoms of fatty degeneration, with dilatation and hypertrophy of heart, had been previously observed.

CCCCLIII.—*Note of a Case of Multiple Arrow-Wounds.* By R. B. HITZ, M. D., Acting Assistant Surgeon.

Private Constand Queswelle, Co. E, 13th Infantry, aged 26 years, received May 24, 1868, while on herding duty about half a mile from Camp Reeve, Montana Territory, seven arrow-wounds. One arrow entered the cavity, through the eighth dorsal vertebra, and one through the ninth; three passed through the fore-arm, one between the fifth and sixth ribs on the right side, and one through the palmer surface of the right hand. Death was apparently instantaneous.

CCCCLIV.—*Report of a Case of Death from Arrow-Wounds.* By G. L. PORTER, Assistant Surgeon, U. S. A.

Nat. Crabtree, a citizen, aged 38 years, while looking for his cattle, April 24, 1868, was shot by Indians, receiving nine arrow-wounds; one in the post gluteal region, one in the left lung, one in the abdomen, one penetrating the humerus, one in the hand, one in the testicle, one in the back to the left of the dorsal vertebra, one in the bladder, and a glance-shot five inches long below the ninth rib. He was admitted to the post hospital at Camp Cooke, Montana Territory. Some of the arrows had been removed by his friends, and five, including the one in the gluteal region, which had penetrated ten and a half inches, were taken out at the post. The man died a few hours after admission to hospital.

CCCCLV.—*Report of a Remarkable Case of Arrow-Wounds.* By J. H. PEABODY, M. D., Late Surgeon, U. S. V.

Private George Osborn, of Troop D, 2d Nebraska Cavalry, was wounded by arrows in a skirmish with Indians near Pawnee Reserve, Nebraska, on June 23, 1863. Eight arrows entered at different parts of his body, and were all extracted except the head of one, which had entered at the outer and lower margin of the right scapula, and had passed upward and inward through the upper lobe of the right lung, or trachea. Hæmorrhage at this time was so great that all hope of recovery was abandoned. The patient, however, rallied, but continued to suffer great pain upon swallowing or coughing, and occasionally spit blood. In July, 1866, more than three years subsequent to the receipt of the injury, he called at the office of Dr. J. H. Peabody, to undergo an examination, with a view of applying for a pension, stating that his health was much affected from the presence of the arrow-head. He was much emaciated, and expressed himself tired of life. Upon probing

through a small fistulous opening just above the superior end of the sternum, the point of the arrow was found resting against the bone, about an inch and a half below, the head lying flat against the trachea and œsophagus, with the carotid artery, jugular vein, and nerves overlying. After some little difficulty, the point of the arrow was raised above the sternum, and it was extracted without the loss of an ounce of blood, the edge grating against the sheath of the innominate artery during



FIG. 22. Iron arrow-head extracted from the chest. Spec. 5642, Sect. I, A. M. M.

the operation. The missile measured an inch at the base, and was four inches long, (FIG. 22.) Its form is shown in the annexed wood-cut, nearly, but not accurately, of half the natural size. The patient, appearing highly gratified at the result, rode to his home. His health underwent a remarkable improvement, and in January, 1869, the operator reported him perfectly well.

CCCCLVI.—*Report of a Case in which the Patient received Five Arrow-Wounds, and was Scalped.*
By S. M. HORTON, Assistant Surgeon, U. S. A.

Private Patrick D. Smith, of Co. H, 18th Infantry, was attacked about six miles from Fort Philip Kearney, Dakota Territory, on the evening of September 26, 1866, by three Indians, who inflicted five arrow-wounds, and removed part of his scalp. On the next morning he was seen by two physicians. Two of the arrows still remained in his body—one in the right side below the region of the kidney; the other had pierced the cartilage at the junction of the first rib with the sternum, inflicting a wound three inches in depth. The arrows were extracted, the wound dressed, and the patient supported until 10 o'clock the next morning, September 28th, when he expired. At the autopsy it was found that the wound in his chest had been the cause of death. The arrow had cut the edge of the right lung, and had inflicted a slight wound, one-eighth of an inch in length, in the descending vena cava. The right lung and surrounding tissues were considerably infiltrated with blood, and a large amount of coagulum was found in the cavity of the thorax.

CCCCLVII.—*Account of a Case of Fatal Wounds from Arrows.* By C. S. DE GRAW, Assistant Surgeon, U. S. A.

Private James Spillman, Troop B, 7th Cavalry, aged 22 years, was wounded on the morning of June 12, 1867, about a mile from Fort Dodge, Kansas, by a party of Kiowa Indians, who made a dash upon the herd of horses he was guarding, and inflicted three arrow-wounds: The first in the right shoulder; the second in the right side, the arrow glancing from a rib, and making a wound similar to a stitch, about three inches in length; and the third through the right lumbar region, penetrating the abdominal cavity to a depth of about eight inches or more. The arrow causing the wound in the side was removed by cutting the arrow in two, and then drawing out the parts. The arrow in the lumbar region was removed with great difficulty. The wound being enlarged, two fingers were inserted on either side of the shaft until the base of the iron head was reached, the fingers thus inserted serving as a guide and as a protection to the parts, when, traction being made, the arrow was withdrawn. This latter wound proved mortal, the man dying the next day about 3 o'clock, P. M. His true name was Wise, of Washington. No *post-mortem*. The two arrows removed were contributed to the Army Medical Museum, and are numbered 5651 in the Surgical Section.

Arrow-Wounds of the Head and Neck.—Special reports of eight cases were received, In five, the cranial cavity was penetrated, and four of the patients perished.

CCCCLVIII.—*Report of an Arrow-Wound of the Skull.* By C. C. GRAY, Surgeon, U. S. A.

Private John Krumholz, of Co. H, 22d Infantry, was accidentally wounded at Fort Sully, Dakota, on June 3, 1869, by an arrow, which, entering at the outer canthus of the left eye, penetrated the skull to the extent of two inches, and is supposed to have passed between the

skull and dura mater. Being admitted to hospital on the same day, he was chloroformed, and an operation for extraction was immediately performed. This consisted in sawing nearly through the skull with a Hey's saw, in close proximity to the arrow. The condition of the injured parts was healthy at the time of operation, and the patient's constitutional state was good. The treatment consisted in rest, low diet, elevation of the head, cold applications, and saline cathartics. Recovery was rapid, and he returned to duty on June 7, 1869.

CCCCLIX.—*Extracts from Reports of Sick and Wounded at Fort McDowell, Arizona Territory.* April and May, 1866. By CHARLES SMART, Assistant Surgeon, U. S. A.

Private Andrew Snowdon, Co. B, 3d Battalion, 14th Infantry, was one of a party surprised by Apaches, March 22, 1866, while *en route* from Maricopa Wells to Fort Goodwin. He was struck on the back of the head by an arrow, which penetrated his skull. It is said that he was nine days in traveling to Maricopa Wells from the place where he was wounded. On his arrival there he is stated to have been weak and fatigued, but with his intelligence unimpaired. He believed the arrow-head to be within the cranium, as in pulling on the shaft after the reception of the injury, nothing but the shaft came away. On or about the 10th or 12th of April, he lost his appetite, felt considerable nausea, and appeared to those around somewhat dull and stupid. He rapidly grew worse, so that it was considered advisable to send him to the post for treatment. He was placed on a hay wagon, and made the journey to Salt River on that conveyance—a distance of thirty miles. At this time I was notified concerning the case, and instructed to proceed to Salt River with our ambulance for him. I found him with a full pulse, slow, and somewhat hard; his mental faculties much clouded; hearing distinctly, and giving answer to every question, although the answer seldom contained the information desired. He tried to remember his name, but could not. He was troubled with a very persistent vomiting. On April 19th, he was received into the post hospital; an active cathartic was administered, his head shaved, and cold dressings applied. During the day his stupor increased to such an extent that the sharpest tone failed to make an impression on him. His pulse 50, full and hard; vomiting much abated. On the 20th, the purgative was repeated, as it had as yet been without effect. The scalp was examined, discovering a small tumefaction, in which was an ill defined sense of fluctuation, situated over the parietal side of the left occipito-parietal suture. Pressure exercised upon it caused the issue of a small quantity of serous matter from a point in the cicatrix of the arrow-wound. This was enlarged, and a probe passed into it was made to feel along a fissure in the bone, when it struck upon something metallic. The cranium was laid bare by a crucial incision, and with considerable difficulty a hoop-iron arrow-head, one and three-quarter inches long, and half an inch in breadth, was withdrawn from the brain. About a drachm of pus followed it in its exit. During the procedure the patient lay quiet, except when at times, without any assignable cause, he would burst into a violent scream. After the operation, which was not noticed previous to it, the right side was observed to be paralyzed. April 21st: Pulse as before. Insensibility great. Paralysis of right side more marked; features drawn to wounded side. Has not eaten anything since his admittance, nor for several days previous to that time. Passes his urine when the nurse solicits him, by the application of the urinal. Bowels unmoved, a cathartic enema was administered. 22d: Seems slightly improved. Enema brought away nothing, but during the afternoon of yesterday he had a large involuntary passage. Has eaten nothing; swallows a mouthful of tea occasionally. Pulse 50. 24th: Has eaten nothing—no improvement—pulse less full, and more compressible. 26th: Yesterday, took a few teaspoonfuls of custard. In afternoon, was feverish and delirious. Enema administered. Features sunken and distorted. 27th: Much improved. Has eaten considerably of a farinaceous preparation. Face more regular in expression. Pulse 54, softened. Answers questions readily, but not to the purpose. Cannot remember his name. 30th: Steady improvement. Has eaten well every day since last report. Pulse 68. Hemiplegia unobservable. Has remembered name, and at times take an interest in what is going on in the ward. Wound of operation healing kindly.



FIG. 23. Iron arrow-head extracted from the brain. Spec. 5654, Sect. I. A. M. M.

During the first week of May he continued to improve; caution concerning diet and an occasional purge being all that was considered necessary. On the 7th, after eating heartily of some soup, which I afterward learned to have been "somewhat greasy," he became slightly feverish, and during the succeeding night did not rest well. On the 8th, skin hot; pulse 65, hard, a little headache, and occasionally sickness at stomach. Cold to head ordered, and an enema administered. From this time he gradually grew worse, complaining much of pain in the head, and stiffness in the back of the neck, while on the 11th and 12th, muscular tremors were the most prominent objective symptom. Unconsciousness set in on the morning of the 13th, and he died quietly about six hours thereafter. *Post-mortem* examination seven hours after death. Body muscular, rigid, not emaciated. A firm cruciform cicatrix on posterior and left side of scalp. The centre of this cicatrix adherent by firm fibres to bone beneath. In the bone almost corresponding in situation with the centre of the cicatrix, was a slit half an inch long, and one-eighth of an inch wide, filled in with recently formed soft tissue, which broke down before the handle of a scalpel. From the upper end of this slit a fissure one inch and a half in length, extended to the inter-parietal suture, while from its other extremity another fissure stretched in curved direction toward the ear two inches. The dura mater was adherent to the margin of the slit in the bone, and to the soft tissue which filled it in; but external to the membrane there was no collection of matter. In the posterior lobe of the left cerebral hemisphere, the track of the arrow-head was followed downward, forward, and inward, communicating with the posterior cornu of the left ventricle. The brain tissue, to the extent of three-quarters of an inch around the track as a centre, was softened and disorganized. The track of the arrow-head was filled with a thick pus, which had extended thence into the ventricle. The right ventricle was also filled, as were the sub-arachnoidean spaces. No other organ examined.

CCCLX.—*Memorandum relative to the Skull of a Mexican Killed by an Arrow.* By W. M. NOTSON, Assistant Surgeon, U. S. A.



FIG. 24. Cranium penetrated by an arrow through the left superciliary ridge. *Spec.* 5644, Sect. I, A. M. M.

An unknown Mexican was killed by an arrow-wound in an Indian fight, which occurred seventy-five miles northwest of Fort Concho, Texas, on February 22, 1868. The arrow perforated the frontal. When I opened the skull, I found an incision extending clear across the opposite hemisphere, touching the dura mater just above the tentorium. The dura mater was stained, but I could find no mark on the skull. When I made the *post-mortem* I found the arrow-head in the brain. When the Mexican was hit he seized the arrow-shaft with both hands and pulled it out, then dropped and of course remained unconscious until he died, about six hours. The specimen was forwarded to the Army Medical Museum. [It is figured in the adjacent wood-cut, (FIG. 24.) The arrow-head has been removed from the cavity of the skull and fastened at the point of entrance. Apart from the lesion, the skull is a highly interesting specimen.—ED.]

CCCLXI.—*Memorandum of an Arrow-Wound of the Face.* By P. MIDDLETON, Assistant Surgeon, U. S. A.

Private William Drum, Co. G, 14th Infantry, aged 20 years, was wounded in a fight with Apache Indians on November 11, 1867. One arrow entered over the malar bone of the left side of the face, passed along the lower border of the orbit to within half an inch of the nose. Another arrow entered through the tendon of the latissimus dorsi muscle on the right side, and passed directly backward toward the spine under the deep muscles, penetrating two and a half inches. He was admitted to the post hospital at Fort Whipple, Arizona Territory, on the following day. On November 19th, I cut down upon the arrow-head in the side, and removed it. The parts healed by the first intention, and on December 3, 1867, the patient was returned to duty.

CCCCLXII.—*Account of an Arrow-Wound of the Scalp and of the Leg.* By HENRY McELDERRY, Assistant Surgeon, U. S. A.

Private William Rosback, Troop F, 6th Cavalry, aged 20 years, was wounded during the night of August 29, 1867, in an attack by Indians on Fort Belknap, Texas, by two arrows; one striking the scalp, the other the outer aspect of the left leg three inches below the knee-joint. Missile passed backward and inward, the spike lodging. He was admitted from company quarters on September 1, to hospital at Camp Wilson. Cold-water dressings were applied. The arrow-head was excised posteriorly in the popliteal space. Isinglass plaster and fused nitrate of silver locally. He was returned to duty on November 24, 1867.

CCCCLXIII.—*Report of an Arrow-Wound of the Neck.* By B. SEMIG, Acting Assistant Surgeon.

Private Thomas Dutton, Co. K, 32d Infantry, aged 23 years, was wounded in an attack by Apache Indians upon a wagon train in the lower Senorita Valley, Arizona Territory, on May 8, 1869, by an arrow which caused a flesh wound of the posterior portion of the neck. He was admitted on the next day to the post hospital at Camp Crittenden, Arizona Territory. He recovered, and was returned to duty May 17, 1869.

CCCCLXIV.—*Accounts of Two Fatal Arrow-Wounds of the Skull.* By W. M. NOTSON, Assistant Surgeon, U. S. A.

CASE 1.—J. C—, with two others, were attacked by Indians on September 1, 1870, near the Pecos River, Texas. One man was killed, another escaped, and C— received an arrow-wound of the head, and three gunshot flesh-wounds—one in the arm, another in the breast, and a third in the leg. Seven days afterward he was admitted to the post hospital at Fort Concho, Texas, having traveled part of the distance on foot and the balance by wagon and stage. When admitted his mental condition was good, and as clear and bright as usual. He complained only of weariness from his ride and some slight soreness of the gunshot wounds, and spoke very lightly of the scratch on the side of his head. Water dressings were applied to the wounds and rest enjoined. The gunshot wounds healed kindly. On the fourth day after admission, the indications being something more than irritative fever, special diet was ordered, and aromatic spirits of ammonia was given in small doses. This prescription was afterward replaced by an ordinary fever mixture. On the night of the sixth day the cerebral symptoms becoming more violent, hydrate of chloral was ordered. On the eighth day a saline cathartic was given, and an effort made by Acting Assistant Surgeon C. W. Knight to reopen the wound of the temple. This attempt proved unsuccessful on account of the resistance of the temporal fascia. Doubt as to the cause of the existing symptoms prevented him from making a free incision. The treatment from this up to the fatal termination of the case, September 19, 1870, was with counter-irritants, nutriment, and stimulants. The autopsy revealed the site of the injury of the bone half an inch from the external incision, which, when first seen upon admission, was a clean cut nearly healed. Pus was found in the wound, ventricles, and meninges. The pathological specimen, showing an iron arrow-head lodged in the petrous portion of the right temporal bone, was contributed to the Army Medical Museum, and is figured in the wood-cut FIG. 25. The following thermograph (FIG. 26) exhibits the variations of the temperature, as observed from the seventh to the eighteenth day of disease, inclusive.



FIG. 25. Cranium with an arrow-head imparted in the right squamous bone. Spec. 5907, Sect. I, A. M. M.

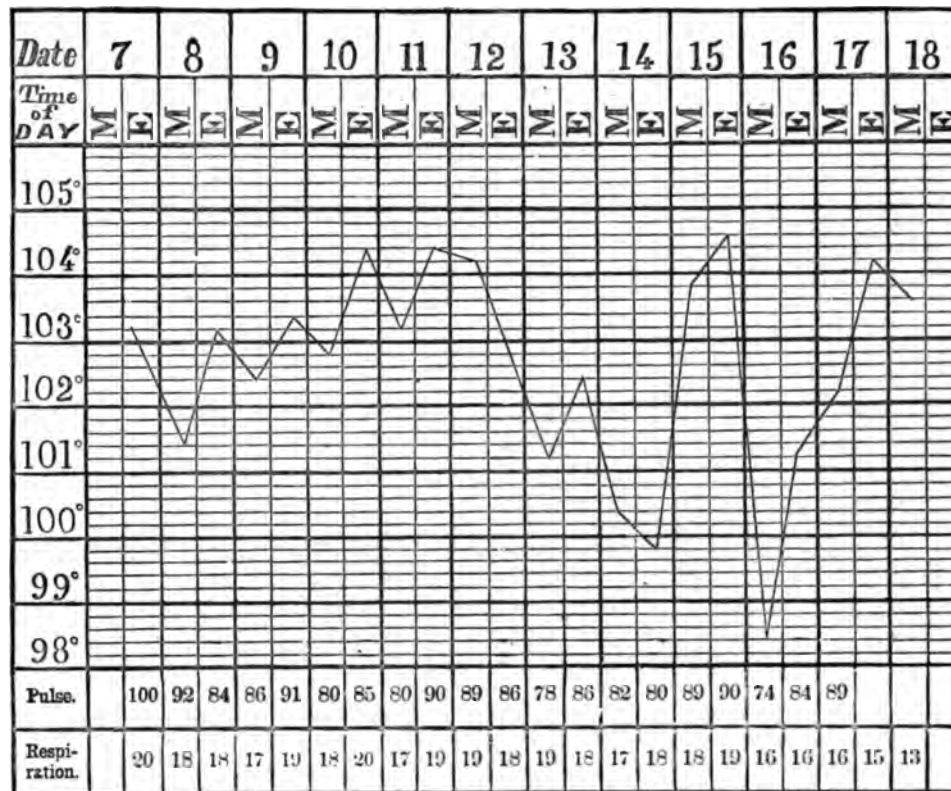


FIG. 26. Thermograph of a Case of Arrow-Wound of Brain from September 7, 1870, to September 18, 1872.



FIG. 27. Cranium with an iron arrow-head impacted in the left temporal bone. Spec. 5908, Sect. I, A. M. M.

CASE 2.—Private Martin W—, Co. E, 4th Cavalry, was killed by Indians, on September 30, 1870, twenty miles from Fort Concho, Texas, while on duty as one of the mail-stage guard from Fort Chadbourne. The escort being attacked by a band of Comanches, this soldier was wounded by an iron-headed arrow, which entered the squamous portion of the left temporal bone, and penetrated the left cerebral hemisphere to a depth of an inch or more, causing intracranial bleeding which was speedily fatal. In the specimen which was forwarded to the Army Medical Museum, and which is represented in the accompanying wood-cut (FIG. 27) the puncture of the thin calvaria, without fissuring, is well indicated. Internally there is no splintering. The vitrous table is as cleanly divided as the outer table.

It was Dr. Bill's belief (*loc. cit.*, p. 375,) that penetrations of the skull by arrows were unusually-characterized by a linear puncture of the outer table, corresponding to the size of the arrow-head, with a crack usually extending from either edge, proportionate in length to the momentum of the arrow, while the inner table, struck by the arrow's point at a reduced velocity was splintered and depressed. But such is not the testimony of the specimens in the Army Medical Museum. They show both tables of the calvaria punctured with little or no fissuring externally or internally. In all of the specimens, the

arrow-heads have been literally impacted, the vitreous table being penetrated as cleanly as the outer. This is in such marked contrast to the results of bayonet or sword thrusts or of the impact of gunshot projectiles as to merit notice.

Arrow-Wounds of the Chest.—Seven cases were specially reported. Among them were two remarkable instances of recovery after penetration of the plueral cavity by arrows.

CCCCLXV.—*Note of an Arrow-Wound of the Chest.* By F. DAMOUR, M. D., Acting Assistant Surgeon.

Private George Duggan, Troop K, 8th Cavalry, was wounded near Camp Willow Grove, Arizona Territory, November 8, 1867, by an arrow, which penetrated the posterior side of the right chest. He died December 17, 1867. At the autopsy, the arrow was found to have penetrated the chest a little above the diaphragm, with which the head of the arrow was lying in contact. There was also an abscess containing much purulent matter.

CCCCLXVI.—*Mention of a Fatal Arrow-Wound of the Lung.* By HENRY LIPPINCOTT, Assistant Surgeon, U. S. A.

Private Benjamin McCassey, Troop H, 7th Cavalry, was wounded at the engagement of Washita River, November 27, 1868, by an arrow which entered the left side at the fourth intercostal space, and passed backward and upward into the lung. Stimulants and opiates were administered with cold-water dressings to the wound. The patient expectorated a great deal of blood. Death resulted on November 30, 1868.

CCCCLXVII.—*Account of Two Cases of Arrow-Wounds, compiled from Memoranda on the Monthly Report of Sick and Wounded at Fort C. H. Smith, for September, 1866.* By H. M. MATTHEWS, M. D., Acting Assistant Surgeon.

CASE 1.—Corporal Alvin H. Stables, Co. D, 18th Infantry, received September 20, 1866, two arrow-wounds in addition to a gunshot wound of the head. One arrow entered the left chest posteriorly, and transfixed the thorax, the arrow-point raising the skin above the right nipple; the other arrow passed through the chest to the left of the median line. The soldier was then scalped by the Indians, and killed.

CASE 2.—Private Thomas Fitzpatrick, Co. D, 18th Infantry, in an engagement with Indians in Montana, was killed by numerous arrow, gunshot, and contused wounds. One arrow penetrated the chest through the left axilla; another, entering under the right nipple, penetrated the vertebral column; a third perforated the left elbow-joint; a fourth and fifth had entered the thorax posteriorly above and below the scapula. A musket ball had passed through the heart, and a second through the right knee-joint. The skull was crushed in from behind by a war club, and there was a tomahawk wound of the left temporal region.

CCCCLXVIII.—*Report of an Arrow-Wound of the Lung, resulting in Pleurisy, and followed by Recovery.* By A. MULLER, M. D., Acting Assistant Surgeon.

John Fenske, a civilian, aged 19 years, came to Fort Ridgely, Minnesota, on the night of August 20, 1862, for surgical aid and protection, having been wounded on the previous day by an Indian arrow, which was shot a distance of about twelve feet, and had entered the back horizontally between the third and fourth ribs of the left side, close to the vertebræ. The arrow, a barbed one,

with the head about three inches long, was buried one inch below the surface of the skin, and had penetrated the left lung. On account of the barbs, it became necessary to make a large perpendicular incision in order to remove the arrow-head, which required for its extraction considerable pulling, the

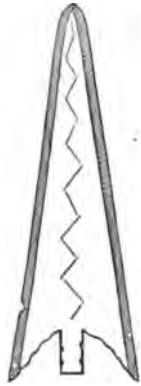


FIG. 28. Barbed Indian arrow-head. From a drawing by Dr. Muller.

sharp edges having been wedged in between the ribs with such force as to bend them over on each side. After its removal, there was a considerable flow of blood for a few minutes, probably from an intercostal artery. The bleeding, however, was entirely arrested by cold-water applications. The wound having been cleansed and its edges brought together by a strip of adhesive plaster, cold-water dressings were ordered and continued for three days. A healthy suppuration then set in, and the wound closed by granulation in thirteen days. It was evident in this case that the arrow had penetrated the left lung through both pleuræ, which diagnosis was fully corroborated by the objective as well as subjective symptoms. The patient complained of severe pleuritic pains (or stitches) through the whole of the left lung at every inspiration. The respiration was greatly accelerated, dyspnoea was often very alarming and palpitations of the heart very severe, obliging the patient to rest in an upright position. Occasional bloody sputæ were observed, and his pulse varied, during the inflammatory process, from 95 to 140. Auscultation and percussion of the thorax revealed an extensive effusion of fluid on the left side, with subsequent hepatization of the upper lobe of the left lung to the extent of the palm of the hand. The treatment was strictly antiphlogistic: Repeated bleeding, (five times in two weeks,) cupping intervening, (from six to ten cups each time,) repeated four times in ten days, affording the patient great relief at each repetition; and application of blisters. Internally tartar emetic in progressive doses, nitre and digitalis, were successively administered, under which treatment, aided by low diet, chiefly milk, the effusion gradually disappeared, and all alarming symptoms subsided. On the twelfth day of treatment, his pulse did not exceed eighty, the effusion in the left pleura had entirely disappeared, with the exception of a small accumulation in the lower left lobe. Light vegetable tonics, with iodide of potassium, were now administered, and a full and select diet adopted. The patient left for home on September 30, 1862, forty-two days after receiving the injury, having so far recovered that only an occasional slight dyspnoea remained. The percussion at this time gave a clear tympanitic sound in the vicinity of the wound, followed by a distinct metallic sound to be heard on auscultation of the parts, entirely similar to pneumo-thorax, which, in this case, was believed to exist to a circumscribed extent, adhesions having formed along the posterior surface of the left lung. He was dismissed with advice to use cod-liver oil. Dr. Muller reports lately that he had occasion to meet this patient four years afterward, and that the remaining untoward symptoms, above described, were considerably ameliorated.

CCCCLXIX.—*Abstract from Reports of an Arrow-Wound of the Thorax.* By JOSEPH KUGLER, Acting Assistant Surgeon.

William Livingston, a private of Troop G, 3d Cavalry, was wounded by Indians while herding horses at Fort Stevens, Colorado Territory, on October 6, 1866, an arrow having entered the right side of thorax between the first and second ribs. It was forcibly extracted by the patient, who stated that a great gush of blood followed. After being conveyed in an ambulance over a rough mountain road, he was admitted to hospital at Fort Garland, Colorado Territory, on the 12th, in a very weak condition, and suffering frightfully from dyspnoea. An examination showed effusion of blood into the right pleural cavity, and the lung impervious, owing to the entrance of blood into the bronchii. Hot fomentations were applied to the wound, and stimulants, afterward followed by stimulating expectorants, were administered, under which treatment the patient was gradually improving on the last of October. On the monthly report for November, the patient is borne as convalescent. He was able to walk about, but there was still a collection of serum or pus in right pleural cavity, and the respiration of that side was merely bronchial. The treatment still consisted of stimulating expectorants, with stimulants and generous diet. In December, he is still reported convalescent. The effusion in the right pleural cavity was diminishing, and air entered more freely into the lung. He was daily gaining strength and spirits, and little doubt was entertained of his making a good recovery. He was returned to duty in February, 1867.

CCCCLXX.—*Memorandum of a Case of Arrow-Wounds of the Thorax.* By WILLIAM M. NOTSON, Assistant Surgeon, U. S. A.

"I send to the Army Medical Museum a specimen of an arrow-wound of the spine. It was taken from the body of a white man who was killed by Indians in 1869, at an outpost near Fort Concho, Texas. I found the man dead. There were extracted from his lungs and heart no less than four arrow-heads, and a fifth was impacted at the junction of the rib with the transverse process of the fourth dorsal vertebra. I removed the fourth and fifth vertebrae and portions of the third and sixth, and forwarded them to the Army Medical Museum. The specimen shows the arrow-head impacted in the right transverse process of the fourth dorsal vertebra and posterior extremity of the rib. The wound does not intersect with the vertebral canal. I could learn no particulars of the case. Any one of the wounds of the thorax would have been fatal." (FIG. 29.)



FIG. 29. Arrow impacted in the transverse process of the fourth dorsal vertebra. Spec. 5673, Sect. I, A. M. M.

Arrow-Wound of the Abdomen.—Three instances of penetrating wounds of the abdomen by arrows have been recorded among the cases of multiple wounds in an earlier portion of this section. Special reports were made of six other cases of this class. Of the nine cases seven were fatal, and in the two cases of recovery, there is room for doubt whether the arrow-head penetrated the peritonæal sac. The great fatality of arrow-wounds of the abdomen is well known, so well known to the Indians that, Dr. Bill tells us, they aim always at the umbilicus. Dr. Bill (loc. cit., p. 385) mentions that Mexicans are accustomed, when fighting Indians, to envelope the abdomen as the most vulnerable part in many folds of a blanket.

CCCCLXXI.—*Report of an Arrow-Wound of the Abdomen.* By H. S. KILBOURNE, M. D., Acting Assistant Surgeon.

Private Samuel Brown, Troop F, 10th Cavalry, was wounded near Canadian River, Texas, December 2, 1868, by an arrow, which entered the abdomen in the left hypochondriac region, making a punctured wound three-quarters of an inch in length, through which about eighteen inches of the small intestine protruded. The intestine was cut in four places. The wounds in the intestine were closed by suture, and the protruding portion of the gut returned through the wound, which was enlarged for that purpose. When found, the man had lain out all night, and was in a state of collapse. He was carried along in an ambulance, but died on the second day, not having rallied from the shock of the injury.

CCCCLXXII.—*Note of a Fatal Arrow-Wound involving the Liver, complicated by Gunshot Injuries.* By S. M. HORTON, Assistant Surgeon, U. S. A.

Bugler Edwin L. Train, Troop D, 2d Cavalry, aged 17 years, was wounded at Fort Philip Kearney, Dakota Territory, June 11, 1867, in a fight with Indians. He received a gunshot fracture of the right arm, a gunshot wound in the left side of chest, and an arrow-wound of the liver. He was admitted to the post hospital. Several fragments of bone were removed from the right arm, and the arrow was extracted by forcing it through the body. He died on June 12, 1867.

CCCCLXXIII.—*Mention of an Arrow-Wound by which the Body was Transfixed.* By C. E. GODDARD, Surgeon U. S. A.

John Locke, an employé of the sutler at Fort Rice, Dakota Territory, was accidentally wounded in February, 1868, by an arrow, which entered the back, three inches to the right of the

fifth lumbar vertebra, and emerged about two inches to the right of the ensiform cartilage. During the evening following, the patient lost about eight ounces of blood externally, and a small amount internally. He was confined to his bed some two weeks, suffering from irritative fever and circumscribed peritonitis. In four weeks he was walking about; and by July 1st, was actively employed. The arrow was contributed to the Army Medical Museum.

CCCCLXXIV.—*Account of an Arrow-Wound of the Abdomen.* By J. P. KIMBALL, Assistant Surgeon, U. S. A.

Private James W. Cooper, Co. E, 31st Infantry, aged twenty years, received, in a fight with Indians near Fort Buford, Dakota Territory, August 20, 1868, an arrow-wound of the abdominal parietes. The missile entered over the centre of the eighth rib of the right side, and passed downward and forward, to near umbilicus. He also received an incised wound of the right hip. He was admitted to the post hospital on the day of injury, complaining of excessive pain. Chloroform was administered, and cutting down upon the head of the arrow, immediately above the umbilicus, it was withdrawn through the incision. The patient reacted promptly, and was doing well until September 25th, when he suddenly experienced a severe pain in the right hypochondriac region, and complained of a gurgling sensation. He became faint, and evinced symptoms of internal hæmorrhage. Cold water was applied to the abdomen, and anodynes were administered. On September 30th, he was slowly improving; and on December 31, 1868, he was still under treatment. This man was returned to duty in February, 1869.

CCCCLXXV.—*Report of an Arrow-Wound of the Back and Kidney.* By CALVIN DEWITT, Assistant Surgeon, U. S. A.

Private Conrad Tragesor, Troop I, 8th Cavalry, was wounded in an engagement with Apache Indians, at Sunflower Valley, Arizona Territory, March 9, 1870, by an arrow, which entered the left side, about four inches from the spine, and above the crest of the ileum, from below upward. The kidney evidently was injured, as the patient passed bloody urine in small quantities, and frequently. His face was pale, anxious, and expressive of great pain; pulse weak. He was conveyed in an ambulance to Camp McDowell, Arizona Territory, a distance of thirty miles, over a rough, stony, and hilly road. He died the next day. At the autopsy, it was found that the arrow had transfixated the kidney, entering it on the external border, at the juncture of middle and lower thirds emerging from the posterior surface near the internal border, a few lines below the pelvis. A large irregular piece, about one inch long, and half an inch thick, was torn from the posterior border of the kidney at the place of entrance, evidently by the traction made in extracting the arrow, leaving the head behind. The kidney was otherwise normal; the abdomen was filled with blood.

CCCCLXXVI.—*Account of an Arrow-Wound of the Pelvis and Abdomen.* By JAMES P. KIMBALL, Assistant Surgeon, U. S. A.

To-Kah K-ten, or "he that kills his enemy," an Indian scout, in a quarrel with a fellow-scout, at Fort Buford, Dakota Territory, January 3, 1870, received a penetrating arrow-wound of the pelvis and abdomen. The arrow entered midway between the right ischium and the anus. The shaft of the arrow having been withdrawn before he came under surgical observation, the exact direction of the arrow could not be determined, but, as the blood marks on the shaft showed that it had penetrated about twelve inches, and the arrow-head would make at least three inches more, it is supposed that the arrow had passed up through the pelvis into the abdomen. Opiates were administered, and light diet and perfect quiet enjoined. The case apparently progressed favorably for several days, when peritonitis supervened, and death ensued January 18, 1870.

Miscellaneous Arrow-Wounds.—None of the forty-eight cases of arrow-wounds mentioned in the nine following reports proved fatal. With one exception the lesions implicated the soft parts only. The regions injured were the scalp or face, or neck in three instances; the parieties of the chest in six; the long muscles of the back in seven; the abdominal muscles in two; the hip or buttocks in three; the testis in one; the shoulder or arm in thirteen; the fore-arm or hand in six; the thigh or leg in seven. A few cases of extraction of arrow-heads, and an instance of brachial aneurism cured by digital compression are noticeable in this series.

CCCCLXXVII.—*Remarks on an Arrow-Wound of the Back.* By J. P. KIMBALL, Assistant Surgeon, U. S. A.

Corporal Edward Monaghan, Co. C, 31st Infantry, aged 24 years, was wounded in a skirmish with Indians near Fort Buford, Dakota Territory, on November 6, 1867, by an arrow, which entered just below the inferior angle of the right scapula, and, passing around the ribs, came so nearly through in front, that the position of the head could be clearly made out. He was at once admitted to the post hospital. There was no swelling or discoloration, and but little hæmorrhage. He was somewhat excited, having walked nearly two miles after the reception of the injury. An incision one inch in length, and about one inch in depth, was made through the pectoralis major muscle, two inches above and a little to the outside of the right nipple. The arrow-head was then removed through the incision, and the shaft removed through the wound of entrance. Three days later, the anterior wound was healing by first intention; the posterior wound suppurated slightly. On November 26, 1867, both wounds had healed, and the patient was returned to duty.

CCCCLXXVIII.—*Note concerning an Arrow-Wound of the Lumbar Region.* By REDFORD SHARPE, M. D., Acting Assistant Surgeon.

Captain E. M. Heyl, Co. M, 9th Cavalry, aged 26 years, was admitted to the post hospital at Fort McKavett, Texas, on November 28, 1869, with an arrow-wound of the left lumbar region, midway between the spine and umbilicus, received in an engagement with Lipan Indians, at the headwaters of the Llano River, Texas. The wound had a direction oblique and backward. He recovered, and returned to duty December 25, 1869.

CCCCLXXIX.—*Report of an Arrow-Wound of the Arm, followed by Aneurism.* By J. N. MCCHANDLESS, M. D., Acting Assistant Surgeon.

Private James Burrige, Co. C, 14th Infantry, aged 22 years, was wounded near Bower's Rancho, Arizona Territory, November 11, 1867, by an arrow, which struck the arm about two inches above the elbow. Traumatic aneurism followed, and on January 3d, digital compression was employed, and continued for twenty-four hours. Before compression, the tumor was about the size of a pigeon's egg, soft and pulsating. One week after the compression, it was reduced to half the size. On January 15th, the compression was repeated for twenty-four hours, and on January 18th, the tumor was almost imperceptible. The patient was returned to duty January 20, 1868.

CCCCLXXX.—*Mention of an Arrow-Wound of the Hand.* By J. B. GIRARD, Assistant Surgeon, U. S. A.

Private Edward M. Detterer, Co. G, 4th Infantry, was wounded at Smoky Hill, Kansas, July, 1867, by an arrow, which split the metacarpal bone of the right thumb down to the trapezium. Amputation at the metacarpal joint was performed, and the radial artery ligated above the wrist on account of hæmorrhage. He was discharged from service August 26, 1867.

CCCCLXXXI.—*Account of Two Cases of Arrow-Wounds occurring near Bowser's Rancho, Arizona Territory.* By P. MIDDLETON, Assistant Surgeon, U. S. A.

Private William Hardwick, Co. C, 14th Infantry, aged 45 years, was wounded in an engagement with Indians on November 11, 1867, by arrows, in the left thigh and right arm. One missile penetrated the rectus femoris muscle at the centre, and passed upward and inward to the bone. Another arrow entered through centre of belly of biceps muscle, and penetrated to the bone. I administered chloroform, enlarged the wound of the thigh, and removed the arrow on the field. On the following day, he was admitted to the post hospital at Camp Whipple, Arizona Territory. On December 15th, both wounds had healed, but the patient had only slight use of his leg. He was, however, steadily improving, and on December 28th, was able to walk on crutches. He was returned to duty in January, 1868.

CCCCLXXXII.—*Report of an Arrow Wound of the Thigh.* By B. SEMIG, M. D., Acting Assistant Surgeon.

Private James F. Tompkins, Co. K, 32d Infantry, aged 26 years, was wounded April 20, 1869, in an attack by Apache Indians upon a wagon-train, in the Santa Rita Mountains, by an arrow, which caused a flesh-wound of the anterior portion of the lower third of the left thigh. He was admitted, on the same day, to the post hospital at Camp Crittenden, Arizona Territory. He recovered, and was returned to duty May 22, 1869.

CCCCLXXXIII.—*Note relative to a Case of Recovery after numerous Wounds from Arrows.* By W. S. TREMAINE, Assistant Surgeon, U. S. A.

Sergeant James Murray, Co. B, 3d Infantry, aged 34 years, in an attack by hostile Indians on the Marl Station on Bear Creek, Indian Territory, May 31, 1870, received seven arrow-wounds; two on the anterior surface of the right arm, one in the right axilla, one on the right side of the chest near the border of the axilla, two on the left arm, posterior surface, near the elbow-joint, and one on the left temple. He was admitted on June 1st to the post hospital at Fort Dodge, Kansas. The wound on the right arm, near the deltoid, discharged, and there was slight exfoliation from the humerus. He was treated with simple dressings, and was returned to duty in July, 1870.

CCCCLXXXIV.—*Memorandum relative to an Arrow-Wound of the Testis.* By A. H. SMITH, Assistant Surgeon, U. S. A.

While serving at Fort Bliss, Texas, in 1866, I had occasion to attend a Mexican herdsman, who had received a wound in the testis from an arrow shot by an Apache Indians. The hoop-iron arrow-head had lodged in the testicle, and the external wound had nearly healed over at the time I saw him, about three months after the reception of the wound. It was not difficult, however, to detect the position of the foreign body and to extract it. Upon its removal the wound cicatrized finely. The specimen was transmitted to the Army Medical Museum. [It is figured in the wood-cut, FIG. 30.—ED.]



FIG. 30. Arrow-head of Apache Indians.
Spec. 5641, Sect. I, A. M. M. (Nat. size.)

CCCCLXXXV.—*Memoranda of Forty Cases of Arrow-Wounds.* Condensed from reports. By D. C. PETERS, Surgeon, U. S. A.; J. M. DICKSON, M. D., T. H. SNOW, M. D., R. WESTERLING, M. D., J. H. MCMAHON, M. D., B. SEMIG, M. D., Acting Assistant Surgeons; S. M. HORTON, H. McELDERRY, J. P. KIMBALL, H. TURNER, Assistant Surgeons, U. S. A., and Surgeon J. F. WEEDS, U. S. A.

Private John Ahern, Troop L, 8th Cavalry; Camp Willow Grove, Arizona Territory, November 8, 1867; slight arrow-wounds in the back and left shoulder. He had recovered December 9, 1867.

Sergeant George Aldrich, Troop C, 2d Cavalry, aged 33 years; Peno Creek, Dakota Territory, December, 1866; wound in right lumbar region by an iron-headed arrow; treated in post hospital at Fort Philip Kearney, Dakota Territory, and returned to duty December 31, 1866.

Private Joseph A. Arkee, Troop I, 3d Cavalry; engagement with Navajo Indians near Fort Sumner, New Mexico, July 9, 1869; arrow-wound of right shoulder, passing through below the deltoid; recovered.

Pa-yan-za, Indian scout; Rocky Cañon, near Donner and Blitzen Creek, Oregon, March 14, 1868; slight arrow flesh-wound of the arm; transferred to Camp Harney, Oregon; recovered and returned to duty.

Big Mack, Indian scout; Rocky Cañon, near Donner and Blitzen Creek, Oregon, March 14, 1868; slight arrow flesh-wound of the arm; transferred to Camp Harney, Oregon; duty.

Private Frank Burr, Troop D, 3d Cavalry; Sierra Diabola, Texas, in an engagement with Miscallero Apaches, October 18, 1867; arrow-wound of right fore-arm; returned to duty.

Private John Butler, Troop I, 6th Cavalry, aged 26 years; Paint Creek, Texas, March 6, 1868; arrow-wound of upper third of left fore-arm; treated in post hospital at Fort Griffin, Texas, and returned to duty on March 11, 1868.

Private Robert Clinton, Troop I, 3d Cavalry; engagement with Navajo Indians, near Fort Sumner, New Mexico, July 9, 1869; arrow-wound of the back below spine of the scapula; recovered.

Private John Cooley, Troop G, 3d Cavalry; Purgatory Creek, Colorado Territory, October 3, 1866; arrow flesh-wound, a few inches in length, on left side of the thorax; treated in post hospital at Fort Garland, Colorado; recovered; duty.

Private John Craig, Troop L, 8th Cavalry; Camp Willow Grove, Arizona Territory, November 8, 1867; arrow perforating wound of the left hand; transferred to Camp Mojave, Arizona Territory; duty.

Private Bartholomew Creeden, Troop I, 3d Cavalry; engagement with Navajo Indians, near Fort Sumner, New Mexico, July 9, 1869; slight arrow-wound of the left arm; recovered; duty.

Private James Daily, Troop D, 3d Cavalry, Sierra Diabola, Texas, October 17, 1867; arrow flesh-wound through the right thigh above the patella; treated in post hospital at Fort Bliss, Texas, and returned to duty October 26, 1867.

William Fee, a citizen, aged 22 years; Crazy Woman's Fork, Dakota, December 4, 1867; slight arrow-wound of muscles of right side of the abdomen; treated in post hospital at Fort Philip Kearney, and discharged December 8, 1867.

Private Gottlieb Harr, Co. C, 18th Infantry, aged 22 years; Crazy Woman's Fork, Dakota Territory, December 4, 1867; slight arrow flesh-wound of the anterior surface of the left thigh; treated in post hospital at Fort Phil Kearny; doing well; duty.

Sergeant John F. Hilmer, Troop L, 3d Cavalry, aged 24 years; June 24, 1870; arrow-wound penetrating the right arm at the inferior third; treated in post hospital at Camp Verde, Arizona Territory; returned to duty in July, 1870.

Private Charles Hoffman, Troop I, 6th Cavalry, aged 28 years; Paint Creek, Texas, March 6, 1868; arrow-wound in upper third of the left thigh; treated in post hospital at Fort Griffin, Texas, and returned to duty March 31, 1868.

Private George Johnson, Troop L, 8th Cavalry; Camp Willow Grove, Arizona Territory, November 8, 1867; slight arrow-wound in the chest over the shoulder-blade; transferred to Camp Mojave, Arizona Territory; duty.

Rudolph Kiuten, citizen, aged 28 years; Pinery, near Fort Philip Kearney, Dakota Territory, December 18, 1867; slight arrow-wounds of the right leg and shoulder; doing well December 20, 1867; recovered.

Sergeant J. R. Ludlow, Troop G, 7th Cavalry; arrow entered immediately behind the junction of the ninth rib with its cartilage and emerged about three inches from the spinal column, same side; discharged from service at Fort Leavenworth, April 8, 1868.

Private Edward Malone, Troop L, 8th Cavalry; near Camp Willow Grove, Arizona Territory, November 8, 1867; slight arrow flesh-wound above the hip; transferred to Camp Mojave, Arizona Territory; duty.

Lieutenant Thomas J. March, 7th Cavalry; Washita River, November 27, 1868; slight arrow-wound of the left hand; recovered; duty.

Trumpeter James Marshall, Troop A, 3d Cavalry, aged 21 years; June 24, 1870; superficial arrow-wound of the right hip; treated in post hospital at Camp Verde, and returned to duty in July, 1870.

Private Joseph Miller, Troop A, 2d Cavalry; Fort Reno, Dakota Territory, July 19, 1868; arrow entered over the external edge of the scapula and protruded through the bicipital portion of the middle third of the arm, from whence it was extracted; returned to duty in August, 1868.

Private Hugh Morgan, Troop I, 7th Cavalry; engagement with Indians, November 27, 1868; arrow flesh-wound of the right arm; treated in post hospital at Fort Dodge, and returned to duty in January, 1869.

Private Clarence G. Morrell, Troop D, 3d Cavalry; Sierra Diabola, Texas, October 17, 1867; arrow-wounds of the right groin, side, and back; treated in post hospital at Fort Bliss, Texas, and returned to duty on November 19, 1867.

Private Daniel Morrison, Troop G, 7th Cavalry; engagement with Indians, November 27, 1868; arrow-wound of the scalp; treated in post hospital at Fort Dodge, Kansas, and returned to duty in January, 1869.

Bugler John Murphy, Troop M, 7th Cavalry; engagement with Indians, November 14, 1868; arrow-wound of the right side; treated in post hospital at Fort Dodge, Kansas, and returned to duty in March, 1869.

Private Charles Murray, Troop F, 10th Cavalry; Beaver Creek, Kansas, August 21, 1867; slight arrow-wound of the left leg; treated in post hospital at Fort Hays, Kansas, and returned to duty.

Corporal Thomas O'Brien, Troop F, 6th Cavalry, aged 21 years; Fort Belknap, Texas, August 29, 1867; slight arrow-wound of the chest, two inches above the nipple; treated in post hospital at Camp Wilson, Texas, and returned to duty September 5, 1867.

Owine, Indian scout, Rocky Cañon, near Donner and Blitzen Creek, Oregon, March 14, 1868; slight arrow flesh wound of the left arm; transferred to Camp Harney, Oregon.

Sergeant Francis Rigby, Troop H, 1st Cavalry; Rocky Cañon, near Donner and Blitzen Creek, Oregon, March 14, 1868; arrow passed through the fore-arm, with cutting edge at right angles to axis of member; treated in post hospital at Camp Harney, Oregon. By some means the arrow-head had been pushed back and became imbedded in the muscles, whence it was extracted; returned to duty in April, 1868.

Private James Ryan, Troop F, 6th Cavalry, aged 29 years; Paint Creek, Texas, March 6, 1868; arrow-wound of lip, treated in post hospital at Fort Griffin, Texas, and returned to duty March 11, 1868.

Lieutenant Gustavus Schreyer, Troop F, 6th Cavalry, aged 29 years; accidental, September 20, 1867; slight arrow-wound of the left thigh; treated in post hospital at Camp Wilson, Texas, and returned to duty October 22, 1867.

Corporal Thomas Sheppard, Troop F, 10th Cavalry; Beaver Creek, Kansas, August 21, 1867; arrow-wound of the neck; treated in post hospital at Fort Hays, Kansas, and returned to duty.

Private George Silence, Troop A, 3d Cavalry, aged 25 years; June 24, 1870; penetrating arrow-wound of the left shoulder; treated in post hospital at Camp Verde, Arizona Territory, and returned to duty in August, 1870.

Private Francis Stall, Troop D, 3d Cavalry; Sierra Diabola, Texas, October 18, 1867; arrow-wound of the right breast; returned to duty.

Private Henry Stockford, Co. G, 31st Infantry, aged 29 years; Fort Buford, Dakota Territory, August 20, 1868; penetrating arrow-wound of internal condyle of the left humerus, requiring the united strength of two men to extract it; returned to duty in October, 1868.

Private William Wagerle, Troop I, 3d Cavalry; engagement with Navajo Indians, July 9, 1869; arrow-wound of the right chest, passing into the pleural cavity; recovered; duty.

Private Lewis White, Troop C, 9th Cavalry; Horse Head Hills, Texas, September 12, 1868; arrow-wound of sixth rib, left side, seven inches from the spine; treated in post hospital at Fort Davis, Texas, and returned to duty September 26, 1868.

Private Michael Zuch, Co. E, 31st Infantry, aged 20 years; Fort Buford, Dakota Territory, August 20, 1868; arrow flesh-wound of the left hip; returned to duty August 23, 1868.

Nearly all of the foregoing instances of arrow-wounds have been copied from "lists of casualties," a few from special reports. The orders which enjoin upon medical officers to forward to the Surgeon General a list of casualties within two or three days after every engagement or skirmish in which they may be on duty, have been generally, but not universally, observed.* It is specially desirable that such returns should be rendered with the utmost regularity and promptness, because many of the wounded in the field do not come under treatment in the post hospitals, and are not accounted for on the monthly and quarterly reports. When casualties occur in small scouting parties, unaccompanied by a medical officer, the medical officer at the nearest post should assume the duty of reporting the killed and wounded by name, with such facts as can be ascertained regarding the nature and seat of injuries. The records of this office prove that he will have, in such cases, the cordial cooperation of line officers; for many reports have been received, signed by lieutenants or captains of infantry or cavalry, enumerating the casualties in their detachments, with the postscript, "I send this as we have no doctor along with us." The two following reports conform to the instructions that have been issued on this subject:

CCCCLXXXVI.—*A Report of Two Fatal Cases of Arrow-Wounds.* By ALFRED D. WILSON, Assistant Surgeon, U. S. A.

A detachment of seven companies of the Fifth Cavalry started from Fort Lyons, Colorado, on May 1, 1869, for Sheridan City, Kansas. On Beaver Creek, Indians were encountered, and a fight ensued. The Indians were pursued towards the Republican River. When they reached Prairie Dog Creek, they dispersed, and it was impossible to follow them further. The command then retraced the route, and then marched in a northwesterly direction to the Platte River, and then westerly to Fort McPherson, Nebraska. There were several casualties from gunshot wounds, and two soldiers were mortally wounded by arrow-wounds penetrating the thorax; viz,

Sergeant John Ford, Troop B, 5th Cavalry.

Private C. A. C. Stone, Troop B, 5th Cavalry.

CCCCLXXXVII.—*Memorandum from a Report of Casualties in an Indian Engagement.* By J. F. WEEDS, Surgeon, U. S. A.

In the engagement of Companies G and I, 3d Cavalry, with a band of Navajoes, near Fort Sumner, New Mexico, July 9, 1869, one soldier died from hæmorrhage from an arrow-wound of the

* See *General Orders*, No. 355, A. G. O., November 4, 1863, *Circular Letter*, S. G. O., March 23, 1864, *Circular Orders* No. 10, S. G. O., October 22, 1867, and Form 55, *Medical Department*.

brachial artery, and four men were wounded so severely that they were dismounted, and, the command being forced to retreat, they were probably at once killed by the Indians, as their bodies were afterward found covered with wounds. These were—

Private John Devine, Co. I, 3d Cavalry, brachial artery severed.

Private James Cook, Co. I, 3d Cavalry, many wounds.

Private William Kerr, Co. I, 3d Cavalry, many wounds.

Private Edward White, Co. I, 3d Cavalry, many wounds.

Private John Lee, Co. G, 3d Cavalry, many wounds.

In this engagement four other soldiers received arrow-wounds of more or less severity, and were taken to Fort Sumner, and treated in the post hospital. All of these cases terminated favorably.

[These four cases are included in the preceding memoranda of forty cases. I have taken the liberty of subdividing the report and classified return made by Dr. Weeds. There was no surgeon with this command; but the wounded, being taken to the nearest post, Dr. Weeds, the post surgeon, offered a good and much needed example, by complying with the spirit as well as the letter of the circular from this office of March 23, 1864, and the instructions on Form 55, *Medical Department*, in forwarding the required Classified Return of Wounds and Injuries and Report of Casualties in the absence of a medical officer attached to the command.—ED.]

The force with which arrows are projected by the Indians is so great that it has been estimated that the initial velocity of the missile nearly equals that of a musket ball. At



FIG. 31. Section of shaft of seventh right rib of a buffalo with impacted arrow-head. *Spec.* 4735, Sect. I, A. M. M.

a short distance, an arrow will perforate the larger bones without comminuting them, or causing a slight fissure only, resembling the effect of a pistol ball fired

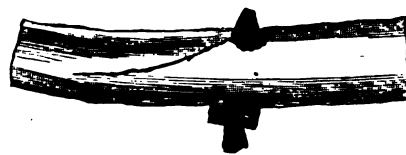


FIG. 32. Section of the eleventh right rib of a buffalo fissured by an arrow. *Spec.* 4736, Sect. I, A. M. M.

through a pane of glass a few yards off. This is well illustrated in two preparations presented to the Army Medical Museum by Professor Joseph Henry, in which the dense laminated portions of the shafts of ribs of the buffalo are transfixated by arrows. These

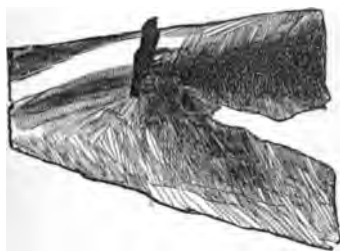


FIG. 33. Section of the left scapula of a buffalo, transfixated by an arrow. *Spec.* 4727, Sect. I, A. M. M.

are represented in the wood-cuts (Figs. 31, 32) The arrow-points penetrating the bones have not produced the slightest splintering, and in one case not even fissuring. The fissure in the right hand figure is much more conspicuous than in the specimen. I have frequently been informed, by officers who served on the Plains, that it was not infrequent for an Indian to send an arrow fairly through the body of a horse or of a buffalo, provided the missile entered one of the intercostal spaces, and did not impinge on bone on the opposite side. That this statement is well founded is rendered probable by the evidence afforded by a preparation forwarded to the museum by Hospital Steward R. Wall, U. S. A., of a portion of the

left scapula of a buffalo, with an arrow-head imbedded in it. The barbed iron head of the arrow has entered the venter of the scapula and the point protrudes from the dorsum, so that the missile must have passed through the thorax. The specimen is from a buffalo killed near Fort Sedgwick, in 1860, by a Cheyenne Indian.

From the narrative of their explorations by Lewis and Clarke, from Schoolcraft's History, and from the works of Mr. Squier and other writers on North American ethnology, and the reports of the Commissioners on Indian Affairs, many interesting particulars can be gleaned respecting the use of the bow and arrow, but the most important recent contributions to our knowledge of *wounds* by arrows have been made by Surgeon W. F. Edgar, U. S. A.; Dr. T. C. Henry,* Surgeon B. A. Clements,† U. S. A.; Surgeon J. H. Bill,‡ U. S. A.; Assistant Surgeon E. Coues,§ U. S. A.; Professor C. A. Pope,|| Dr. A. Muller,** and the authors of the foregoing reports.

In the foregoing reports of eighty-three cases of arrow-wounds, twenty-six, including nearly all in which the three great cavities, or the larger bones or joints were involved, proved fatal. A greater fatality would be represented had more complete returns been made.†† In hostilities in the Indian country, military and other exigencies sometimes

* GROSS. *A System of Surgery*, 4th ed. Philadelphia, 1866. Vol. I, p. 361.

† CLEMENTS, quoted in *Hamilton's Military Surgery*.

‡ BILL, *American Journal of the Medical Sciences*, N. S. Vol. XLIV, p. 365.

§ COUES, *The Medical and Surgical Reporter*, 1866. Vol. XIV, p. 321.

|| POPE, *St Louis Medical and Surgical Journal*, January, 1864.

** Dr. Muller reports some unpublished facts of historical as well as surgical interest: "Dakota is the vernacular designation of the Sioux Indians, and the whole nation is divided into seven principal tribes viz. I. Mdewakantonwans; (Village of the Spirit Lake), about 2,000 souls. II. Wahpekutes, (Leaf Shooters), about 500 to 600 persons. III. Wahpetonwans, (Village in the Leaves), about 1,000 to 1,200 souls. IV. Sisitonwans, (Village in the Marsh), Sisiton, about 2,500 souls. V. Yanktonwanna, (End Village Band), about 4,000 souls. VI. Yanktonwans, (Village at the End), about 2,400 persons. VII. Tetonwans, (Village of the Prairie), about 12,500 souls. Prior to the great Indian outbreak in Minnesota, in August, 1862, the three first-named bands occupied the country east and south of the Red Wood River, on the Upper Minnesota River, and were, therefore, called Lower Sioux; while the four last-named lived further west, on the Upper Minnesota River, at Lac-qui-parle, at and west of Big Stone Lake, or Lake Travers, to the Upper Missouri River, in Dakota Territory, and called "Upper Sioux," where the "Tetons" still reside; while all the rest of the tribe, were driven from the State of Minnesota in 1862, and are now scattered all over the western plains, on both shores of the Missouri River. In their warfare they use all sorts of shot-guns, from an old flint-lock musket to the best kind of Kentucky rifles, the younger and poorer of them being obliged to resort to *bows* and *arrows* for the chase and for battles. The arrow shafts are prepared from hickory, white ash, and a willow which grows in abundance along the banks of all the streams. The arrows of the same tribe are not always made of the same size and material, and are shaped by the savages according to their prevailing fancy; the Tetons, on the Upper Missouri, for instance, using both iron arrow heads and also those made out of flint. No particular difference exists between the war arrow and the arrow for the chase, although most of the Indians are in the habit of painting the shafts of their arrows prior to their going on the war path, with red and other colors. For the chase of smaller birds and other animals, arrows without heads are used, a knob of different size being cut out of the wood the arrow is made of in place of the head. In order also to prevent the easy extraction of the arrow head, the war arrows are often only glued to the shaft, which glue becoming softened from blood, &c., readily detaches the head from the shaft. Burning punk is also often attached to the arrow, for the purpose of setting fire to houses, &c. The iron heads are prepared by the Indians, and also furnished principally by blacksmiths in the Government employ. The Indians make them out of hoop and sheet iron, the shape and sharpness being given by means of a file, according to convenience. No radical difference exists in the arrow heads of different tribes. In the same quiver of an Indian belonging to any one tribe, a great variety of different shaped arrow heads will be found, which proves that the same tribe follows no special type, but fashions them according to any kind of taste. The shallow groove which exists longitudinally down the entire length of each shaft, has, to my knowledge, no particular object, and the feathers used on the arrows are taken from almost any bird, such ones possessing gay colors being preferred, principally by the Upper Sioux (Sisitons) Indians. The various colored bands at the rear end of the arrows are purely ornamental, and have no other significance, so far as I could ascertain.

†† I cannot find on file in the War Department reports of the casualties of the engagement in which Brevet Lieutenant Colonel W. J. Fetterman, Eighteenth Infantry, and forty-nine soldiers, were killed, most of them by arrow-wounds, near Fort Philip Kearney, December 21, 1866; or of General W. S. Hancock's engagement with the Cheyennes, at Pawnee Fork, on April 13, 1867; or of Lieutenant Colonel G. A. Custer's attack on the Black Kettle Band, at Washita, November 27, 1868; or of Major E. A. Carr's affair with the Sioux, at Beaver Creek, October 18, 1868; or of Major A. W. Evans's fight with the Comanches, December 25, 1868; or of the encounter of Major E. A. Baker, with the Piegans, at Mountain Chief, Montana, January 23, 1870. In all of these engagements the newspapers state that arrows, as well as fire-arms, were employed by the Indians.—ED.

preclude the possibility of rendering the returns required of medical officers. For example, in several recent instances, the surgeon's own name would be among those appearing in the list of killed or wounded. But, whenever practicable, it is to be desired that full returns of the casualties in these skirmishes and expeditions should be made, and that medical officers should specify the nature and seat of injuries minutely.*

Reference to the reports here printed, and to the papers that have been cited, will suggest most of the facts we possess in connection with arrow-wounds and their treatment.

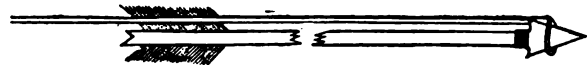


FIG. 34. Wire loop for extracting arrow-heads embedded in soft parts, (After a drawing by Dr. Bill.)

The methods of extracting arrows are described in detail by Dr. Bill, and several ingenious expedients are described for removing the barbed heads of arrows when buried in the soft parts or large cavities, or when impacted in bone. In an instance in which a Navajoe arrow had penetrated the lung for five inches, Dr. Bill succeeded in removing it by means of a snare, as represented in the preceding wood-cut; (FIG. 34), the arrow-shaft being used as a guide to the wire, and



FIG. 35. Wire-twister recommended by Dr. Bill. It should be twelve inches long. (From Dr. Bill's paper.)

the great danger of detaching the head from the shaft being avoided. Where arrow-heads are lodged in bone and cannot be detached by slight traction, aided by a gentle rocking motion of the shaft, the plan which Dr. Bill advises is to procure a piece of well-annealed iron wire, two and a half feet in length, to pass the ends through the holes in a long suture wire-twister, and secure them to its handle (FIG. 35) leaving a loop at the distal extremity (FIG. 36). The loop passed over the feathered end of the shaft is to be thrust down to the other extremity and made to snare the arrow-head, and, the wire being tightened, the foreign body and instrument are to be withdrawn together. Dr. Bill suggests that two straightened catheters soldered together would answer in place of the wire-twister, and the ecraseur now supplied with the army field-instrument cases would probably prove a yet

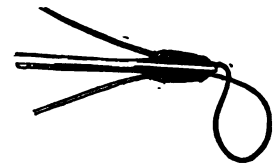


FIG. 36. Wire loop twisted once on itself for snaring impacted arrow heads. (From Dr. Bill's paper.)

more convenient and reliable implement. But, whenever possible, it will be preferable to cut down upon the arrow-head and to remove it with forceps;—for the surgeon should not work in the dark.

The subject of the treatment of arrow-wounds may be passed over with this brief reference to the writings of the medical officers whose observations of such injuries have been most extensive. Further on is an abstract of a case of an arrow-head forming the nucleus of a vesical calculus. In accordance with the plan of this report, it is placed among the operations for lithotomy. The Army Medical Museum possesses also two remarkable specimens of the penetration of bone by stone arrow-heads. Both appear to

* In examining the reports, it is often difficult to decide whether a contused wound that is cited, should be classified with the gunshot, or with other injuries, or to obtain any clew to the cause of an incised or punctured wound. By noting these particulars, medical officers will greatly facilitate the work of consolidating their reports and arranging the statistical information contained in them.

be of great antiquity

One was discovered, in looking over a large number of bones exhumed by Acting Assistant Surgeon A. T. Comfort, from tumuli near Fort Wadsworth, Dakota, in the course of his interesting explorations of the Indian mounds, in that vicinity, in 1869, and consists of the spinous process of one of the lumbar vertebræ, in which a small quartz arrow-head is encysted. The



FIG. 37. Stone arrow-head imbedded in the spinous process of a lumbar vertebra. Spec. 5553, Sect. I, A. M. M. [Natural size.]



FIG. 38. Reverse view of the foregoing specimen.

missile is so overlaid by new osseous formation, as to prove that the wounded man survived the injury for many months at least. Two views of the specimen are exhibited in the wood-cuts adjoining, (Figs. 37 and 38.) The other preparation is a cranium transferred to the Army Medical Museum, by the Smithsonian Institution. It is a skull of an Indian, of advanced age, obtained in Alameda County, California, by Dr. C. Yates. A long flint arrow-head has penetrated the cranial cavity through the left orbit. The lower maxilla is fractured almost vertically to the left of the symphysis. The wood-cut (Fig. 39), shows the form of the cranium and the position in which the flint was found impacted.



FIG. 39. Cranium with a stone arrow-head in the left orbit. Spec. 5531, Sect. I, A. M. M., Reduced 4.]

Stone arrow-heads are still used by many of the North American Indians*. Many specimens collected in Arizona, California, Utah, and Oregon, have been forwarded to the museum. It was believed by the collectors that these, in many instances, were poisoned arrows. Repeated experiments that I have made of inserting the points beneath the skin of small animals, as frogs, birds, and mice, have had negative results, the punctures healing readily, and the animals surviving. The Indians may dip their arrow-heads in rattlesnake venom, or the decayed livers of animals, as is commonly stated; but it is more than doubtful if the arrows thereby become poisonous.†

Dr. Bill suggests the employment of archers, with regular troops, to pick off sentinals noiselessly; but he remains more strictly in his province as a medical officer in advising a cuirass for soldiers employed in Indian hostilities.

* Lieut. E. G. Beckwith, 3d Artillery (*Reports of Explorations for a Route for the Pacific Railroad*, Vol. II, p. 43, of 2d Report), gives the following description of the manufacture of these stone arrow-heads by the Pitt River Indians of California:

"One of them seated himself near me, and made from a fragment of quartz, with a simple piece of round bone, one end of which was semi-spherical, with a small crease in it (as if worn by a thread) the sixteenth of an inch in depth, an arrow-head, which was very sharp and piercing, and such as they use on all their arrows. The skill and rapidity with which it was made, without a blow, but by simply breaking the sharp edges with the creased bone by the strength of his hands—for the crease merely served to prevent the instrument from slipping, affording no leverage—was remarkable."

† PARÉ, ed. Malgaigne, p. 183, and the Lyon edition of 1652, p. 287. Also BALINGALL, *Outlines of Military Surgery*, 5th ed., Edinburgh, 1855, p. 399; and Professor F. H. HAMILTON, M. D., *Treatise on Military Surgery*, New York, 1865, p. 525. There has always been a wide-spread belief in the poisoning of arrow-heads. Every one will recall the "*Nec venenatis gravidæ sagittas*," in Horace, (*Od. I, 22, viii.*) Pliny relates (*Lib. XVI, cap. 35.*) of the famous Scythian bowmen: "*Scythæ Sagittas tingunt viperina sanie, et humano sanguine, irremediabile id scelus mortem illico affert levi tactu.*" Under the articles "TOXICUM" and "SAGITTA," in the lexicon of Facciolati and Forcellini, many references to similar allusions by classical authors may be found.