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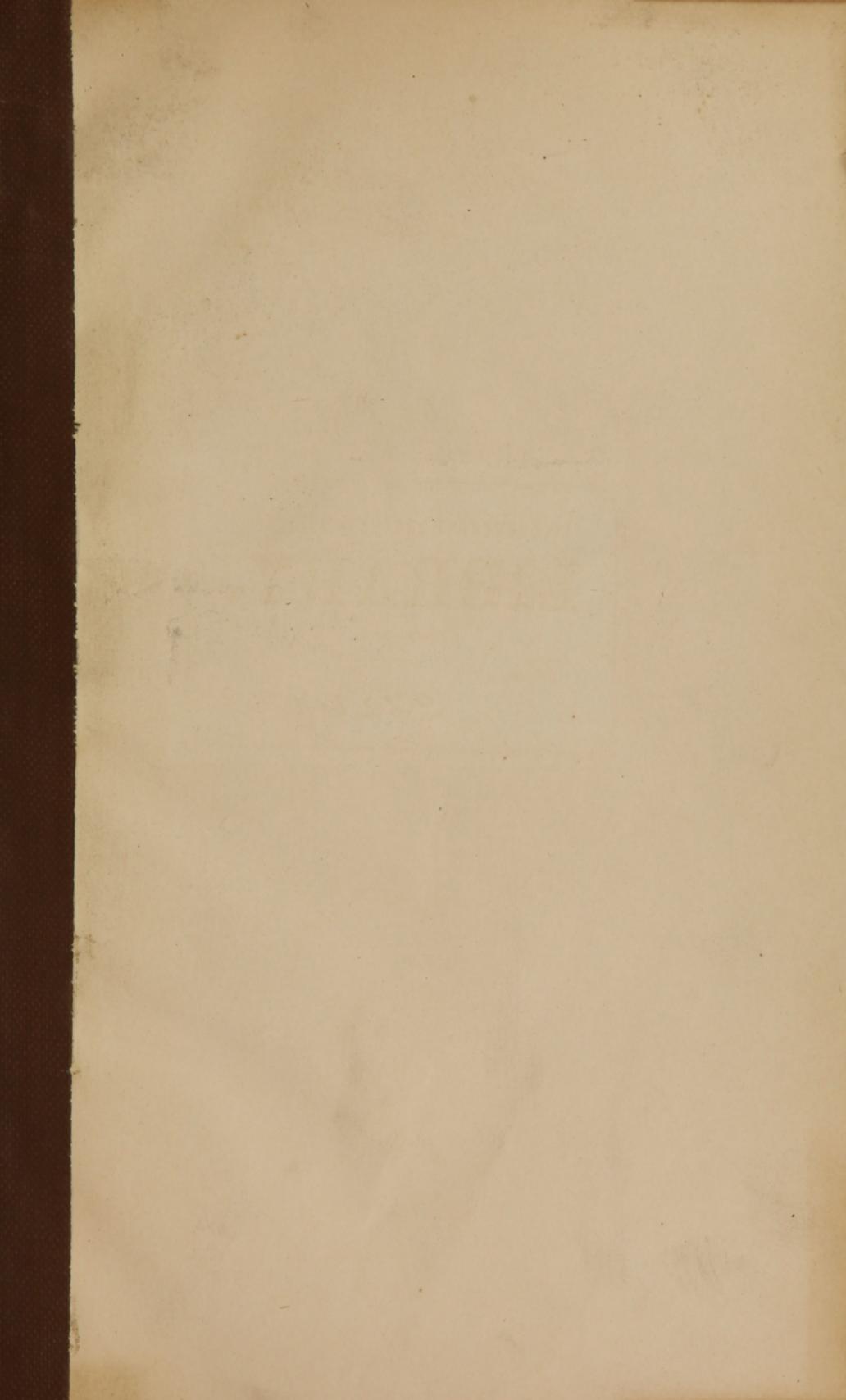


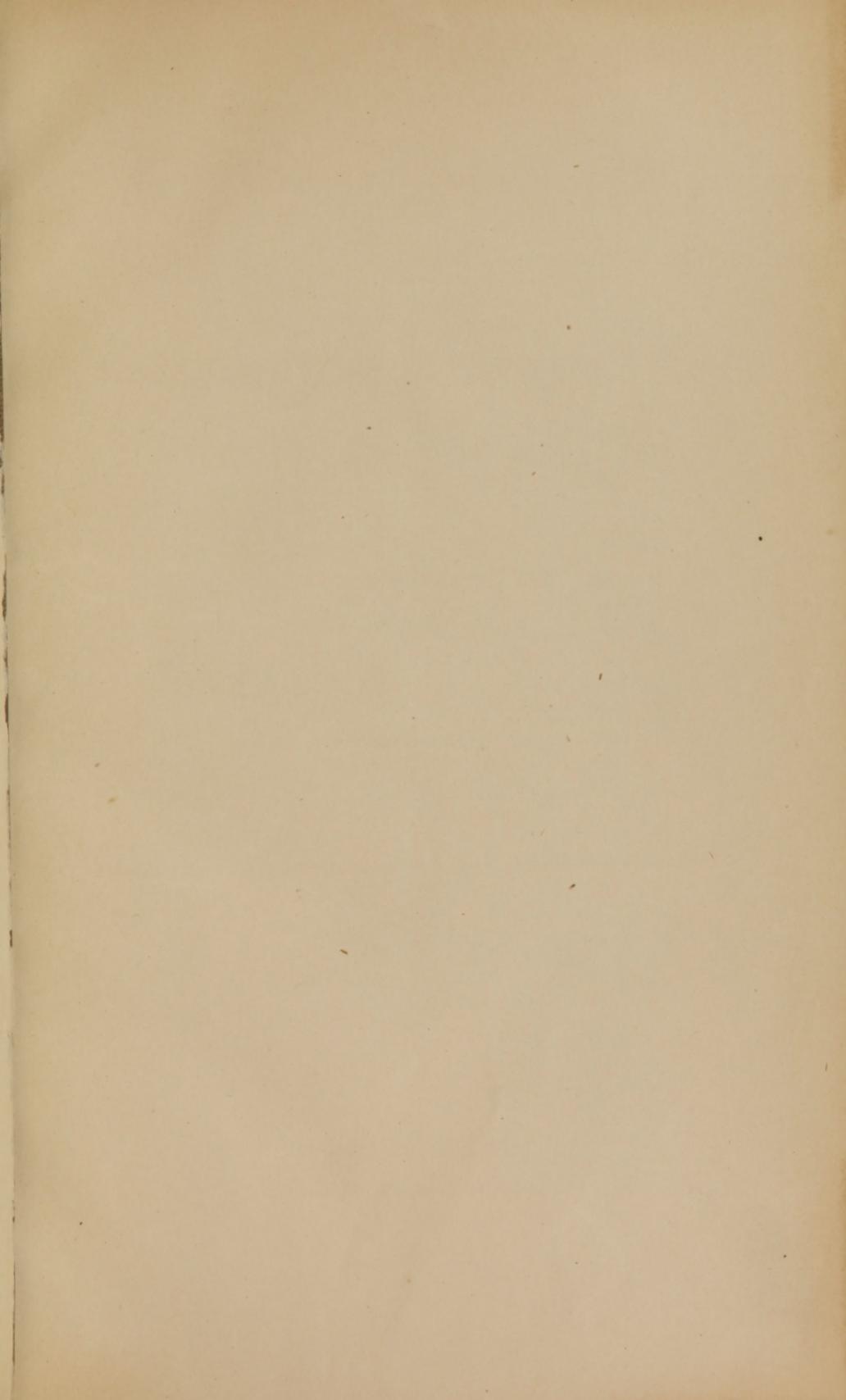
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Inguinal Aneurism:

Successful Ligation of External Iliac Artery by means of Silver Wire

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BY

C. H. MASTIN, M. D.,

OF MOBILE, ALA.

(Read before the Mobile Medical Society, July 16, 1866.)

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Annex

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INGUINAL ANEURISM.

ON the 25th of May, 1866, I was requested by my friend, Dr. W. T. Webb, of this city, to take charge of a case of Inguinal Aneurism, in the person of an old and trusted servant of his family, Venter Woods, col'd, 53 years of age. His general health was at this time good. For thirty-two years past he had led an active life upon a plantation, and with the exception of slight rheumatic attacks, had never been sick. These pains have always been located in the limb which is now the seat of diseased artery.

About the close of December, 1865, he noticed, for the first time, a small pulsating tumor in his left groin, which gradually increased in size, becoming more and more painful, until two months later (the 1st of March, 1866) he was forced to abandon his work. Believing he was suffering from his old rheumatism, which was proving more ungovernable than former attacks, he sought the advice of a physician residing near, and was advised by him to come to Mobile for an operation, as his disease "was not rheumatism." Several weeks later, when he was placed in my hands, I found a large fusiform aneurism of the left groin, pulsating violently, with great oedema of the thigh, leg and foot. This tumor, passing from under Poupart's ligament, had extended downward, until it protruded into the saphenous opening, lifting up the falciform process of the fascia lata, the crescentic edge of which process, stretched across the tumor, marked it with a distinct sulcus. The artery, from above the epigastric and circumflex ilii arteries, to considerably below the point from which the profunda leaves the femoral, was the seat of an aneurismal tumor.

A consultation with Drs. Nott, Brodie, and other medical friends, decided that ligation of the iliac artery offered the only possible chance for his recovery, as the very great oedema of the limb rendered it unsafe to attempt compression of the vessel. Having fully apprised him of the dangers of the operation and the probable failure of the same, he determined to take the chance offered. Just previous to the operation, by measurement we found a difference of six inches in circumference between the two thighs, and an increase

in temperature of 3° in the region of the tumor, above that of the sound side; the former being 96° , the latter 93° .

June 9th. This morning, having cleared his bowels by an enema, and placed him fully under the influence of chloroform, assisted by my friends, Drs. Brodie, Ross and Iglehart, and in the presence of some fifteen medical gentlemen of the city, I proceeded to ligate the iliac artery, through a line of incision beginning at a point a little outside of the upper and outer edge of the external ring, and extending to a point in a line drawn from the anterior superior spine of the ilium to the umbilicus, and two and a half inches from that process. The incision passed in a plane parallel to the fibres of the tendon of the external oblique muscle, and was just five inches in length. After having cut through the integuments, together with the three muscles, the fascia transversalis was uncovered. I did not cut through this fascia at the point where it was first exposed, but with my hand gently passed between it and the muscle of the same name, I reached a point near the brim of the true pelvis, where the peritoneum leaves this fascia, to be reflected backward over the pelvic viscera. Here a small space is found, filled with cellular tissue, and at this point the fascia was opened, without injury to the peritoneum. Having reached this subfascial space, so to speak, by gently introducing the hand the peritoneum may be lifted upward from the psoas muscle, and the vessel exposed.

The greatest difficulty in the operation is the opening of the sheath of the vessel, which consists more truly of a mass of dense fibro-cellular tissue, binding the artery and vein close together, than a true arterial sheath. This renders the passage of the aneurismal needle around the artery both difficult and dangerous. I however succeeded in opening this, and, separating the vessels, passed from within outward a silver wire (No. 32, of the silversmith's gauge) around the external iliac, at a point half an inch below the bifurcation of the iliac proper. This wire was secured by a double knot; the ends, cut close to the knot, were bent down and returned into the cellular sheath. All pulsation ceased in the tumor immediately upon the knot being drawn, previous to which time it had been intensely violent. The wound was now closed by three sutures of gilded annealed iron wire, which were passed deeply through the integuments and the three muscles, while the space intermediary between these sutures was closely united by pin sutures passed through the skin alone. The wound was now dressed with cold water, and, after the

effects of the chloroform had passed off, 50 drops Tr. Opii were ordered, and the patient was returned to his bed.

To my friend, Dr. R. L. Brodie, I am indebted for the following notes of the progress of the case until it was discharged cured. It is an interesting fact that, with the great œdema and the age of the patient, there should have been so little fall of temperature in the leg, after having had the full supply of blood cut off. On one day only, the second after the operation, was there to be observed a difference of more than two degrees between the two limbs.

“5½, p. m., five hours since the operation, complains of some nausea, the effects of chloroform. No pulsation whatever in the tumor, which has measurably subsided, presenting a soft, doughy sensation upon pressure. Pulse; 66 beats at wrist. Thermometer in diseased groin shows a temperature of 98°; in groin of sound side, 100°. Bottles of hot water had been used around the leg since the operation, but were removed for 15 minutes before the thermometric observation was made.

June 10th, 9, a. m. Slept well during the night. No pain whatever, with only slight sensation of numbness in the leg and foot. Oedema much diminished. Temperature of room, 86°; sound groin, 104°; diseased groin, 100°. Passed a quantity of pale limpid urine.

June 11th, 11½, a. m. Rested quietly last night. No pain either in leg or bowels. Incision appears to be glued firmly together; tumor rather more firm and much lessened in size. Oedema continues to subside. Pulse, 98. Temperature of room, 86°; diseased groin, 96°; sound groin, 98°.

June 12th, 10½, a. m. General condition favorable; although he was somewhat restless in the early part of the night, toward morning he slept quietly. His appetite is capricious. The wound has, toward its upper and outer angle, a slight erysipelatous blush, with some tenderness upon pressure. Oedema of limb much reduced. Pulse, 84. Temperature of room, 86°; groin of operation, 96°; sound side, 98°.

June 13th, 11, a. m. Slept well last night. No pain. Pulse, 86. Tongue slightly furred; bowels unmoved since operation. A solution of citrate of magnesia was ordered, with instructions to repeat the same if necessary. The wound looks better, the blush having faded. No change in the thermometric condition.

June 14th, 9, a. m. His condition appears improved. Magnesia operated well, but left him with some slight nausea, which an effervescent draught quieted. Tongue cleaning; pulse reduced to 80. No appreciable difference in thermometric state since the 12th.”

June 15th, 9½, a. m. This morning I noticed a point of ulceration around the *gilded* sutures, and concluded to remove them. I was not a little astonished to see, upon their removal, a tablespoonful of thick pus pour out from the space closed by these sutures. The pin sutures showed no appearance of ulceration, and the edges of the wound, at the points through which the pins had passed, seemed to be thoroughly healed.

Was it probable that the iron wire, which was gilded, could have proved more irritating than the ordinary "Carlsbad suture-pin;" or may it have been possible that a sort of galvanic action had been set up by this wire, composed as it is of two different metals, producing a galvanic issue? There was no more strain upon the wire than upon the pins, as both were passed and confined simply to close the wound without pressure. Whatever may have been the cause, one thing is certain—there has been no more suppuration or ulceration, save around the points through which have passed these gilded sutures. The discharge of pus comes from a little pouch entirely subcutaneous, and just where these sutures have passed. The muscular wound is entirely closed, also the portions of integument united by the pins.

A mixture of chlorate of potash, with a few drops of the muriated tr. of iron, was ordered every three hours; also compress over abscess, with roller around abdomen.

"June 16th, 11, a. m. Venter has improved very much within the past twenty-four hours, and every symptom gives assurance that he is decidedly better. Tongue clean, and discharge of pus much lessened. No pain. Pulse, 84. Ordered the medicine continued at intervals of four hours, and gave him a bottle of porter.

"June 19th, 11, a. m. There has been no material change in his condition for several days, with the exception that, from the point of ulceration, two small sloughs of cellular tissue escaped. The pin sutures are removed to-day. No ulceration whatever where they were used, and the wound perfectly cicatrized, with the exception of the small pouch around the point of wire sutures. This however granulates kindly. He takes brandy, porter, and good diet.

"June 23d. Nothing has occurred of interest since the last note. Fourteen days have elapsed since the operation. The wound has nearly healed. Got out of bed to-day and walked around his room. Has no pain, and very little numbness about his leg or foot. Tumor lessened to almost the size of a pecan. Oedema scarcely to be no-

ticed. Circulation through the collaterals, from all appearances, established."

July 14th. Venter is walking about the city. His limb has assumed its natural appearance, the tumor has disappeared, and, with the exception of weakness, the result of confinement and the excessively hot spell of weather through which we have recently passed, we may without hesitation pronounce him well, and radically cured.

The line of incision adopted in this operation avoided injury to the epigastric artery, and lessened the chances of ventral hernia, as was liable in the line proposed by Sir Astley Cooper. There was also less danger of injury to the peritoneum than in the operation of Abernethy or Mott. On the score of hæmorrhage, no vessel is in danger, not even the little artery of Haller which supplies the skin. Being below the line of incision, it was avoided, and scarcely two spoonsful of blood were lost. No ligature was used, and the little venous blood lost was apparently the result of congestion of the dermal tissue.

It was my intention, when the operation was commenced, to ligate the common iliac, as the size and extent of the aneurism justified the opinion that the vessel was diseased, at least up to the bifurcation. I was relieved, however, to find sound space upon which I could secure a ligature, half an inch below the point at which the external leaves the common iliac. This offered a small space for a clot; but, with the hope of having an encysted ligature, I determined to try the experiment. This line of incision afforded ample space to ligate the common iliac, should it have been found necessary to do so, without extending it longer, as is necessary in the operation of Abernethy; or to make an angular cut, as is requisite, if the line of Sir Astley Cooper is adopted. The gentlemen around the table saw clearly the entire course of the common iliac, when the wound was held apart by the curved spatulæ, and there was no more difficulty in ligating one than the other. By incising the fascia at the place I have suggested, we are absolutely safe, as regards doing any injury to the peritoneum; and a sort of valvular wound being made, we lessen the risk of ventral hernia.

Upon the point of ligating so large a vessel as the iliac with a metallic thread, and leaving the same to become encysted around the artery, I am not aware that it has ever before been successfully performed. In 1859 Dr. Stone, of New Orleans, tied the common iliac, for a case of aneurism of the external iliac, with a silver thread; but,

unfortunately, his patient died on the twenty-sixth day after the operation, from some disease of the bowels, consequently offering no satisfactory results as to the use of metallic threads in these operations. If it can be established as a safe procedure (and I have no hesitation in saying that it can be), we have gained much in being enabled to close the wound by the first intention, thus lessening the chance of inflammation, suppuration, hernia, and, not least of all, secondary hæmorrhage. This usually takes place at the time when the ligature ulcerates through the coats of the artery, and the impetus of the heart's force impelling the blood against the clot, an opening is forced in the weakened tissue of the vessel, and hæmorrhage is the result. However, when the metallic thread has been used, and not tied so tight as to rupture the coats of the vessel, ulceration, if it does occur, is at least retarded, until the clot on the proximal side has in a measure become organized and the vessel obliterated. There being no clot formed on the distal side of the ligature, even should this ligature be late in coming away, and the proximal side perfectly closed by clot, or even obliterated, we still have danger of hæmorrhage at the time the ligature separates, dependent upon a recurrent circulation through the sack of the aneurism.

However, should we have been fortunate enough to place upon the vessel a ligature of some substance which will be slow in producing ulceration, or perhaps not cause it at all, but lie harmless in the tissues, we at least lessen the chances of hæmorrhage, and convert a hitherto grave operation into one of comparatively little danger. Even with the advantages offered by these ligatures, it must not be considered that they are entirely free from danger, or that I am disposed, under all circumstances, to advocate their use. Such are not the views which I entertain. I am satisfied that the trouble most to be apprehended in the use of inorganic ligatures, where they are left to be encysted in the sheath of the vessel, is subsequent irritation, which may be produced in the associate nerve against which they are to lie in contact. That they will become encysted and remain innocuous, so far as ulceration or subsequent abscess is to be considered, has been fully tested and proved by experiments to which I will refer before closing this article. I am persuaded, however, that the point has not yet been settled, and that there is probable danger of neuritis being excited, which will necessitate the removal of the metallic knot. We see this state of things to take place when a leaden ball has been lying for years harmless in the flesh; it may

change position, and give trouble from pressure upon a nerve twig. In these cases the pain is intolerable, and when the ball is removed, we observe the cyst to be dry, offering no appearance of suppurative inflammation. The same thing is observed where other inorganic substances have become encysted and remain, without giving trouble, for years. I have recently removed a fragment of glass, about the size of a filbert, from under the plantar fascia of a gentleman of this city, which had been there for the past twelve years, and, until very recently, had caused him no pain. The glass was perfectly encysted, showing no appearance whatever of either inflammation or moisture. The circumstance of having trod upon the glass years before had been forgotten, and was not remembered until he sought relief for what he believed to be "a wen in the bottom of his foot." It was now causing him trouble by interfering with his locomotion, owing to pressure upon the internal plantar nerve.

That the pressure of the ligature against a nerve may cause trouble, at least functional, if not organic, there can be no doubt. In 1849 I remember to have been present at the ligation of the common carotid artery for aneurism. No operation was ever better performed. The sheath was opened without injury to its contents, and a silk thread passed around the vessel. Almost immediately the most intense hiccough set in, caused by the presence of the ligature against the pneumogastric nerve, and this continued to such an extent as to threaten the life of the patient. By the use of antispasmodics, opiates, etc., he was rendered more comfortable until the separation of the ligature, which fortunately took place without hæmorrhage, and the patient was cured.

In those arteries which have no associate nerve in their sheath, these objections do not obtain. The iliac offers a most favorable example, as the nearest nerve, the anterior crural, is separated in its entire course from the vessels by the psoas muscle, and with the exception of the genito-crural nerve, a small thread lying outside of the sheath, there is no nerve upon which pressure can be made. Hitherto, the liability to secondary hæmorrhage after ligation of this vessel has been so great, that the operation has offered few hopes of success; hence some procedure is requisite, by which this danger may be lessened or averted. I believe nothing will offer more chances of a successful issue, than the use of the metallic thread.

Just here, upon the subject of metallic ligatures, the profession has been much interested for the past few years, and much has been

written, both in Europe and America. It appears to my mind, that the *suture* has been confounded with the *ligature*, and, with this view, it has been attributed to Dr. J. Marion Sims, as having been its originator. He certainly deserves the full meed of praise for his application of the silver thread as a *suture*, in his special operations; and the publication of his cases, together with his remarkable success in an operation hitherto considered almost as the opprobrium of our art, has won for him the high position which he occupies, and has introduced extensively in the various operations of surgery the use of this wire, as a *suture*, but not as a *ligature*. To the late Dr. Henry S. Levert, of this city, is due the credit of first having brought the attention of the profession to this most interesting subject. At the suggestion of the late Dr. Physic (who had observed that leaden balls would remain apparently harmless in the tissues after becoming encysted), he was induced to institute a series of experiments upon inferior animals, in which he ligated the various large arteries, using both organic and inorganic material as the ligature. These experiments established the fact that leaden, gold, and silver wire would become encysted, and not cause ulceration of the arterial tunic. The result of these experiments, some thirty or forty in number, constituted his inaugural thesis, and was afterwards published, by order of the faculty, in the "*American Journal of Med. Sciences*," vol. iv., p. 17, 1829. The preparations were deposited as wet specimens, together with a history of the same, being a contribution to the "Wistar Museum of the University of Penn.,"*

It remained however to be applied to practice, and it is to be regretted that this justly honored physician and surgeon, who afterwards enjoyed a large and extensive field of observation, should have neglected to introduce the principles he first established.

I have been led to make this statement as an act of justice to the memory of Dr. Levert, without attempting to detract anything from those who may have applied the principle suggested to more successful practice. True it is, he who, acting upon the suggestions of another, puts in practice an art, is justly entitled to the reward of his labors; but the mind which first conceived the idea, should receive its due proportion. It is meet, therefore, that we "render unto Cæsar the things that are Cæsar's."

*NOTE.—During the summer of 1848, I repeated the experiments of Dr. L. upon the arteries of dogs, using principally the leaden wire; and after having repeated them to a considerable extent, in almost every instance I attained the same results described in the paper above mentioned.

with a book in English and German. It appears to be a book
The volume has been written with the Germans and with the
and it has been written for the German people as they have
The volume is written in a style which is the best of its
and the publication of his case together with the remarkable
was in an operation which was described almost as the operation
of our art, but was for him the high point of his career, and
has extended extensively in the various countries of the world
and of this case as a whole, but not as a separate case. The
The volume is written in a style which is the best of its
the attention of the public to the most interesting part of
the operation of the late Dr. Brown, who had of course had
half a century ago, and it is a matter of course that when
mentioned, he was induced to institute a series of experiments
upon various subjects, in which he ligated the various parts of
the body, both organic and inorganic material, as the brain, liver,
stomach, and intestines, and the fact that he had shown that
could become arrested, and that some liberation of the arterial
flow. The result of the experiments, some of which are in
his own hands, and was after he published
in order of the faculty in the "Journal of the University of
and in 1877. The propositions were deposited in the
of the University of the University of Toronto, being a contribution
to the History of the University of Toronto.
All the material referred to is applied to practical cases, and is
written in the most practical and concise manner, and it is
with regard to a large and extensive field of observation, should have
been included in the principles of the first published
I have been led to make this statement as an act of justice to the
memory of Dr. Brown, without attempting to detract anything from
those who may have applied the principle suggested to more success
in practice. This is to be done upon the suggestion of an
other man, a matter which is mainly omitted to the credit of his
memory, but a man which concerned the issue should receive
as its proper share. It is, therefore, that we should have
to state the things that are done.

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