Contributions to practical surgery / by W.H. Van Buren.

CONTRIBUTIONS

TO

PRACTICAL SURGERY.

BY

W. H. VAN BUREN, M.D.,

PROFESSOR OF ANATOMY, UNIVERSITY OF NEW YORK; FORMERLY ONE OF THE SURGEONS OF THE NEW YORK HOSPITAL, OF THE BELLEVUE HOSPITAL, AND VICE-PRESIDENT OF THE N. Y. ACADEMY OF MEDICINE; CONSULTING SURGEON TO ST. VINCENT'S HOSPITAL, AND THE WOMAN'S HOSPITAL; MEMBER OF THE PATHOLOGICAL SOCIETY AND THE MEDICAL AND SURGICAL SOCIETY OF NEW YORK; MEMBER OF THE U. S. SANITARY COMMISSION, ETC. ETC.

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PREFACE.

The following Surgical Papers have been selected from the professional periodicals in which they were originally published, and thrown together in the present form, in the hope that they may prove useful to those interested in the pursuit of practical surgery. Their only merit consists in the fidelity of the record they present of the results of actual practice; and the Author regrets that the unremitting claims of daily professional duty must be proffered in explanation of their obvious imperfections.

CONTENTS.

CASES

OF

AMPUTATION AT THE HIP-JOINT

BY A MODIFIED PROCESS.*

I.

AMPUTATION OF THE THIGH AND SUBSEQUENT AMPUTATION AT THE HIP-JOINT, FOLLOWED BY PERFECT RECOVERY.

THE subject of the present notice was brought before the Academy of Medicine, for the inspection of its members, at the regular meeting of May 1st, 1850, within six weeks after the second amputation, on which occasion the following history of his case was read, and the morbid specimens therein described were exhibited. At this time he was almost entirely well.

A residence for several months in the country subsequently contributed to the perfect restoration of his strength, and for the last four months he has supported a numerous family by his daily exertion, enjoying meanwhile full and perfect health.

In connection with the cases already on record, in which amputation at the hip-joint has been success-

* From the Transactions of the New York Academy of Medicine, vol. i. Read May 1st, 1850.

fully effected after the previous removal of a portion of the limb below, the present case will assist in demonstrating the greater safety of the operation under these circumstances.*

The unusual size and apparent tendency to reproduction in the bony growth, which rendered the operation necessary, are also features of interest in the case; while the method adopted in the disarticulation of the thigh, it is believed, has not been hitherto described.

Elijah Vanderhoof, a native of New Jersey, of moderately good constitution, forty-three years of age, and the father of a family, came under my care in the month of May, 1848, with an immense tumor involving the lower half of the femur of the left side.

About twenty years before, he had wrenched his left knee in wrestling, in consequence of which he was confined to the house for a few days; and some three months after this accident he first noticed an enlargement about the knee-joint, which had, since this period, continued slowly to increase in size, the tumor extending gradually up the thigh.

At the time of my first examination the tumor involved the whole circumference of the limb, extending from the knee-joint upward as far as the middle of the femur; it was immovably connected with the bone, and measured twenty-eight inches in circumfer-

* There are three cases on record besides the present, in which amputation at the hip-joint has been done after a previous amputation in the same limb above the knee, viz.: that of Astley Cooper, in 1824, (*Lond. Lancet*, vol. ii. p. 96, 1824;) Mayo, in 1841, (*Cyc. Prac. Surgery*, part ii. p. 182;) Sands Cox, in 1844, (*Memoir, etc.*, Lond., 1845.) All have been successful.

ence. On its anterior aspect it was generally spherical in shape, with slight irregularities on its surface; posteriorly it was very irregular and craggy, presenting several hard, projecting, knobby eminences. It had everywhere the feel of bone covered with a thin layer of tissues. It was not tender to the touch, although there was a point where the skin had recently assumed a dusky-red appearance, which caused some complaint, apparently the result of simple tension of the integuments.

There were no large veins observable on its surface. The tumor was more prominent on the posterior aspect of the limb than elsewhere, and seemed to terminate abruptly about six and a half inches above the condyles of the femur; anteriorly it shelved off more gradually, and extended apparently some four inches farther upward. The knee-joint was but slightly movable, and its motions were not accompanied by pain.

During the past year he had suffered almost constantly from a dull aching pain in the tumor, which was invariably more severe at night, and in damp weather. This pain seemed to be gradually increasing in intensity, and had of late deprived him of sleep and diminished his appetite. He was also losing flesh, and had a pulse more frequent than natural.

I arrived at the conclusion that the tumor was benign in its character, and that it was most probably an exostosis of the femur; and also that the pain was caused by the tension of the soft parts, more particularly of the nervous trunks, resulting from the growth of the bone, which seemed to have been of late more rapid than formerly.

This view of the nature of his disease I communicated to Mr. V., informing him also of the probable continuance of its injurious influence upon his general health, and eventually upon his life, and advised him accordingly, as the tumor could not be removed, to lose the limb.

He consented to this course, and on the 20th May, 1848, I removed the limb by the double flap operation, using chloroform, which acted well. In view of the benign character of the disease, I was anxious to save as much of the thigh as possible by sawing through the femur close to the tumor, and to effect this it was necessary to encroach upon the soft parts covering the diseased mass, in order to obtain flaps of the necessary size. The shape of the tumor enabled me to make the lower flap of full dimensions by carrying the knife close up to the portion of the bony mass which projected posteriorly. As the upper flap, however, could not be made in the same manner by transfixion, because the tumor extended so much farther upward on the front of the thigh, I made a semicircular sweep of the knife through the tissues covering the tumor, and dissected up the flap thus circumscribed, from its surface, so that when the flaps were drawn well back by the retractor, I was able to saw through the femur just above its middle, and exactly on a line with the uppermost edge of the tumor on the front of the thigh. (See wood-cut, fig. 2.)

The femur at the point where it was sawn through was to all appearance perfectly sound. The flaps were ample and well proportioned, and looked precisely as if they had been made from a healthy thigh.

The patient bore the operation well, under the influence of chloroform.

It was necessary to administer morphine freely during the first few days following, on account of his restlessness and irritability.

Toward the end of the first week erysipelas made its appearance in the stump, and extended thence upon the abdomen, where it ceased. Previous to the appearance of the erysipelas, which at this time was usually prevalent in the city, coincident with the epidemic of typhus fever of 1847–8, the patient's skin became intensely yellow. About the tenth day, after the erysipelas had mostly subsided, the stump suddenly swelled up and became exceedingly tense, so much so that I apprehended arterial hemorrhage within. There was no pulsation, however, and it proved to be venous. A large coagulum formed, which was eventually dissolved and discharged with the pus from the external openings which were kept freely enlarged. The purulent discharge was consequently copious, and highly colored by the blood until the twenty-second day, when the stump had assumed a perfectly healthy appearance. The patient was early put upon generous diet and tonics, and at the end of the fifth week, the ligatures having all previously come away, the stump was entirely healed. By the end of the sixth week he was again engaged in his occupation, that of a shoemaker, and not materially altered in appearance by his sickness, which I attributed mainly to his early use of supporting treatment.

The tumor on examination presented a magnificent specimen of true osteo-cartilaginous exostosis. Its

periphery was everywhere covered by a layer of fibro-cartilaginous material varying in thickness from a line to more than half an inch, filling up its anfractuosities and giving it a much more uniform appearance of surface than it has at present after maceration. It is now exceedingly irregular in outline, covered by rounded knobs and craggy stalactitiform projections. (See wood-cut.) The condyles, it will be seen, participate in the alteration. The weight of the tumor when recent was thirteen pounds. The soft parts covering the bony mass were to all appearance perfectly healthy, with the exception of the alteration consequent upon the pressure of the tumor, and their change of position. The nervous trunks, particularly the popliteal and peroneal prolongations of the sciatic, were observed to be thicker than natural, and had evidently, by their elongation, been subjected to very considerable stretching.

From the early part of July, 1848, the period at which he resumed his ordinary occupations, until the same month in the following year, I saw my patient but two or three times. He was enjoying very good health, and complaining of nothing except a very trifling occasional uneasiness in the stump or in the toes of the amputated limb. As this was not an unusual occurrence, I attached but little importance to his complaints.

In the latter part of July, 1849, he called upon me, complaining of increased pain, which was now located entirely in the stump; and, on careful examination, I found to my regret that there was an evident enlargement of the remaining extremity of the femur, apparently of the same nature as the original disease.

From this time I saw him more frequently, and on each occasion he complained of more pain in the stump, and I recognized an increase of size in the disease. Little was done for him besides the application of cold, and subsequently of narcotics, to the seat of the pain. Early in the winter he was compelled to resort to the habitual use of opium, in order to render the pain endurable; and, meanwhile, I fancied that an enlargement of the bone could be detected, extending almost as far upward as the great trochanter.

His health now began to fail a second time, under the combined influence of the constant pain and the habitual use of opium. He grew irritable and sleepless; his digestion became impaired, and he again began to lose flesh.

In the absence of all other remedies, I hesitated about recommending a second amputation higher up in the continuity of the femur, as there was no absolute certainty that the whole of the disease could be thereby removed; and, if it could be entirely removed, I could give my patient no assurance that he would not suffer from a return of the disease in the portion remaining. Under these circumstances, as there existed an obvious necessity for interference, I felt myself justified in recommending him to submit to the disarticulation of the remaining portion of the femur.

Under the influence of his increasing sufferings, my patient did not long delay his determination to undergo the proposed operation; and accordingly, on the 21st of March, 1850, with the assistance of Drs. James R. Wood, Metcalfe, Isaacs, and Cunningham, and in the presence of Professors Mott and Parker, Drs. Batchelder, Markoe, and a number of my medical

friends and students, I removed the disease by amputation at the hip-joint.

Of the mode of operation I will speak more fully hereafter; suffice it to say at present that it was satisfactory in all respects. The artery was admirably commanded by Dr. Wood, by compression at first against the pubes, and afterward in the anterior flap; while the hemorrhage from the posterior flap was temporarily arrested by Dr. Isaacs, who also managed the limb, until the bleeding points were secured by ligature. By careful examination it was ascertained that not more than ℥x of blood were lost. About twenty ligatures were required.

The influence of the chloroform, which was administered entirely by Dr. Metcalfe, was perfect in every respect.

The flaps, which fitted well, were brought together with but little delay, and retained in contact by six points of suture and intervening straps of adhesive plaster; light but sufficiently firm compression was uniformly effected by a single roller.

At the time the patient was placed in bed, which was about forty-five minutes after he commenced inhaling the chloroform, his pulse was 68; he was then partially conscious. Half an hour afterward, when his consciousness had entirely returned, it was 75, and perfectly natural in quality.

He exhibited no evidences whatever of shock from the operation.

Drs. Moore, of Indiana, and Doneghy, of Kentucky, my former pupils, remained attentively with the patient during the ensuing twenty-four hours. By the third day his pulse had increased to 112; but on the

following day it was again below 100, which it has never since exceeded. It was found necessary to continue the opium, as before the operation, but not in any large quantities. After the third day he was allowed to use soup, and gradually to resume a nutritious diet. The dressings were not removed until the seventh day, and at this time the edges of the wound were entirely united, except at the angles, which had been purposely kept open. Subsequently one or two other points discharged slightly. The oozing had been, up to this time, unusually free. Quinine was administered after the tenth day, in order to provide against the suppuration which, from so large a wound, I anticipated would be very copious; but, although about this time his pulse began to be a little more frequent, the discharge in twenty-four hours I do not think at any time reached ℥ii. So moderate was it in fact that, taking into consideration the very slight amount of constitutional excitement after the operation, and the absence of all evidences of inflammation in the stump, I have but little doubt that at least nine-tenths of the wound healed directly by the first intention.

On the twenty-first day, before which time the ligatures had been all removed, our patient sat up in a chair, with but little assistance, while his bed was being made.

He suffered occasionally from colicky pains in the bowels, occasioned probably by his opium, and required two or three times a moderate dose of castor oil with laudanum; otherwise he has not experienced an unfavorable symptom since the operation to the present time, a period of not quite six weeks; and I

presume that those gentlemen now present, who saw him at the time of the operation, will remark but little change in his appearance since then. There is still a trifling discharge from the angles of the wound, and a slight tenderness of the stump, which latter is also mainly owing to the morbid sensibility caused by the habitual use of the opium, which he has not been able as yet entirely to relinquish.

I propose to send him into the country for a few weeks to confirm his cure.

Remarks.—With regard to the use of chloroform in this case, the first successful operation of the kind in which, I believe, it has been employed, I can say nothing that does not confirm the immense value of the new remedy. It will be noticed that no shock whatever to the system followed the operation—the most severe of its kind that can be done on the human body; and, in view of its value in this respect, its employment is fast becoming a matter of absolute duty to the operating surgeon; while its power of annihilating pain, and the terrible consciousness of mutilation, no one can fully appreciate who has not personally experienced its admirable influence.

In the present case, some delay occurred in bringing the patient under the full influence of chloroform, (which, as usual, was administered in an adjoining apartment,) on account of the slowness of respiration and irregularity in the action of the heart seemingly produced by it. These symptoms, which would have caused any one less skilled in its use than Dr. Metcalfe to hesitate, and perhaps to have deprived the

patient of its aid, were in great part owing to the patient's familiarity with the influence of the opium, which, like the habitually excessive use of alcoholic stimulus, appears to interfere to some extent with its successful administration. As it was managed, however, its ultimate effects could not have been happier in any respect.

The question may be asked, as the tumor for which this second amputation was done was a reproduction of the original disease, on what ground was the diagnosis founded that it was a simple exostosis, and not a malignant growth? I confess that the return of the disease was a suspicious circumstance, and also that the singular variety, as well as the comparative rarity of malignant tumors of bone, have united to render the question of their diagnosis not a little obscure.

From the want of more certain knowledge with regard to their mode of development and histological peculiarities, it is sometimes impossible to arrive at a diagnosis as to their true nature, even under the microscope.

In the present case, the nature of the disease was inferred from the uniform hardness of the tumor, its weight, and its striking and fanciful irregularities of outline; and it was confirmed by its slow growth, the absence until recently of pain, and its nature, the absence of enlarged superficial veins, and also of the evidences of cachexia which generally accompanies malignant disease in its advanced stages. It will be observed that no one of the symptoms enumerated can be considered pathognomonic of benign, or of malignant disease—if we except perhaps the peculiar irregularity of outline—and to this symptom I would

attach more importance than to any of the others, as distinguishing an exostosis from a malignant tumor of bone. And yet in many cases of the osteo-cartilaginous variety of exostosis, like the present, where the irregular outline of the bone is covered with a variable layer of cartilage, this characteristic is by no means well marked.

The slowness of growth of the tumor would seem to be no evidence of absence of malignity, nor yet its origin in mechanical violence. Uniform hardness of surface is also met with in soft cancer of bone, where the disease commences in its medullary cavity, in the earlier stages of its growth; it is also met with in enchondroma under the same circumstances, and in other non-malignant growths when they take their origin within the cavities of the bones. As to the matter of pain, about which so much is said in connection with the diagnosis of malignant disease, I do not hesitate to say that its presence or absence affords no useful indication whatever as to the nature of the disease in tumors connected with bone. I shall not trespass upon the attention of the Academy at present, by attempting to demonstrate the truth of this assertion, but will merely remark that in the careful analysis of more than one hundred and fifty cases of malignant disease with regard to this point, I was driven to the conclusion that there is no variety of pain strictly characteristic of any form of cancer, or of the disease in general. In a large proportion of the cases of soft cancer, there was total absence of the symptom; but occasionally, when a nervous trunk was subjected to tension, the pain was excessive—it was always, however, attributable to the tension or to inflammation

excited thereby in the surrounding tissues, and never to the tissue of the tumor itself. This conclusion accords entirely with the anatomical fact that nervous filaments have never yet been detected in the substance of these heterologous growths. Hence I would offer the conclusion that the pain experienced by my patient, which seemed solely to account for the deterioration of his health, in no way invalidates the diagnosis as to its nature—although the disease did return after its removal. And I presume that this conclusion will be confirmed on examination of the reproduced disease on the upper half of the femur last removed. (See wood-cut, fig. 2.) The specimen previous to dissection was successfully injected by my friend Dr. Isaacs, to whose kindness I am indebted for its preparation. It will be perceived that the appearance of the disease corresponds with the description already given of the tumor first removed. It is of a uniform bony hardness, and very irregular outline, involving the lower end of the bone, and extending upward toward the trochanter. One spicular prolongation projecting toward the joint, on its anterior surface, was grazed by the knife in cutting out the anterior flap; had this flap been half an inch longer, the knife would have been caught behind this bony projection, and the operation unavoidably delayed. This danger was partially recognized beforehand.

As this specimen has been preserved in the wet state, the layer of the fibro-cartilage on the surface of the bone can be recognized.

In removing the layer of muscles covering the disease, it was noticed that the *sartorius* and *rectus*, and most of the *adductor* group, were closely attached

by their cut extremities to the enlarged bone; the first-mentioned muscle, in fact, was inserted by a

Fig. 1.

well-marked tendon, and was noticed before the operation to act strongly as a flexor of the stump. The

muscles preserved their volume fairly, although they had evidently undergone some degree of fatty atrophy.

The femoral artery was pervious, and apparently of full size up to a point about two inches from the extremity of the bone, where it became transformed into a fibrous cord, (B.) The sciatic nerve was considerably enlarged, particularly at its extremity, where it is closely adherent to the surface of the bone, occupying, as it were, a valley between two projecting crags of bone, by the growth of which it was constantly subjected to increasing pressure, (A.) This was the spot upon the stump to which most of the pain was attributed before its removal.

A few remarks upon the mode of operation, and I will close.

Amputation at the hip-joint is one of the few operations in surgery in which rapidity of execution would seem to be absolutely essential to success. Its great dangers arise from shock to the system and loss of blood. The former, it has been seen, was to be obviated by the use of chloroform. It was therefore left for me to choose the method of operating by which the limb could be removed with the greatest rapidity, and therefore with the least loss of blood.

It is almost unnecessary to remark that the numerous modes which have been recommended for the disarticulation of the hip-joint are merely variations of one of the three principal methods of performing amputations in general: *i.e.* of the circular, oval, or flap operations. The former, the operation recommended by Abernethy, for obvious reasons has fallen into disuse. The oval method, that proposed by Cornuau and Malgaigne, a safe but necessarily a slow operation, has

never to my knowledge been employed in a successful case. The flap operation has been justly preferred by the majority of operators and writers, in one of its varieties, viz., by lateral or by antero-posterior flaps, either single or double.

Twelve years ago I was taught in Paris that the operation by antero-posterior flaps was the preferable mode; at present both of our teachers of surgery in this city recommend the method by lateral flaps, and it has also been employed in the three instances in which this amputation has been performed here.* In favor of the former mode we have the names of Beclard, Baudens, Sedillot, Liston, and Fergusson; while Larrey, Guthrie, Lisfranc, and Mott have preferred the lateral flaps. A large proportion also of the favorable results on record have followed the use of the lateral flaps, among which is the last successful case of which I have any knowledge, that of Mayo, of London; this circumstance is explained, however, by the fact that this method has been the one most generally resorted to, as the same proportion holds good in its unsuccessful employment.

In this division of opinion, on a matter which I believed to be of so much importance to my patient, I betook myself to the dead body, and divesting myself as much as possible of all preconceived prejudices, determined to ascertain, by repeated trials, by which method I could most safely and quickly disarticulate the thigh. I tried the circular, oval, and flap operations in all their varieties, some of them repeatedly; and finally adopted a method which I have

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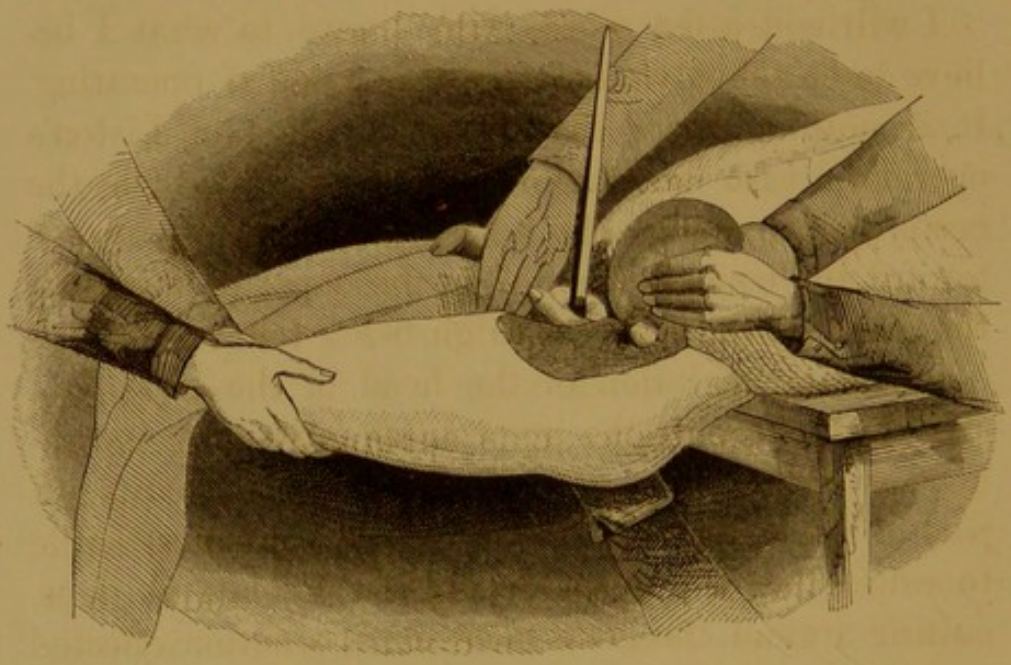
* By Drs. Mott, Hoffman, and Buck.

not met with elsewhere, and which I shall therefore attempt to describe.

The patient, already under the influence of chloroform, being placed on his back upon a table, with the buttocks projecting beyond its edge, the limb to be removed is committed to an assistant previously instructed as to its management,—the other limb to a second assistant, who carries it with the scrotum and penis as far as possible to the opposite side, and who also steadies the pelvis; the external iliac artery is then, at the word, forcibly compressed against the horizontal ramus of the pubes by the principal assistant; and the surgeon, standing on the outer side of the limb, transfixes it with a straight narrow knife, ten inches long, entering its point about an inch above the great trochanter, grazing the head or neck of the femur, if possible, as it passes in front of it, and, pushing it through the integuments near the anus at a point diametrically opposite to its entrance, cuts out an anterior flap in the usual method, at least six inches in length. Meanwhile the principal assistant, passing one hand into the wound behind the knife, grasps the flap, and with it the artery before it has been divided, and as soon as the division is completed, with both hands carries the flap upward as forcibly as possible. The surgeon then, slightly kneeling, carries the knife beneath the thigh to its inner side, as in a circular amputation, and placing its heel on the integuments at the internal angle of the wound, sweeps it firmly across through the tissues on the back part of the thigh, cutting with a slightly sawing motion down to the bone, and joining the two extremities of the first incision. The long knife is then immediately relin-

quished, and with a large straight scalpel, the femur being forcibly abducted, the capsule of the joint is laid open as near as possible to the acetabulum, the round ligament divided with the rotator muscles inserted into the trochanter, and the fossa at its base, the assistant managing the limb so as to keep these parts successively on the stretch, and the operation is completed. (See wood-cut.)

Fig. 2.



A large compress or folded towel is then immediately applied to the surface of the posterior flap by the assistant, who drops the amputated limb, and the arteries are secured in detail. The femoral and profunda, if well commanded, may be left until after the branches of the gluteal and ischiatic arteries have been secured in the posterior flap.

The arteries should be tied as rapidly as security will allow—the flaps brought together with as little

delay as possible,* and the patient removed to his bed, where, if his condition allow, he should be left entirely undisturbed to recover from the influence of the chloroform.

I employed the operation thus described in the case of my patient, and I may truly say that there was not a circumstance occurred in its progress that I could wish to have happened differently. Indeed, with such assistance as I enjoyed, it could not have been otherwise.

I will add a few words with regard to what I believe to be the advantages of this mode of operating. It is nothing more than a modification of Liston's operation with antero-posterior flaps, in which the posterior flap is made by cutting from without inward toward the bone, instead of in the opposite direction, the disarticulation of the thigh being left to the last.

The disarticulation of the head of the bone, and the detachment of the great trochanter from its numerous connections, is confessedly the most difficult part of the operation ordinarily, and that most liable to cause delay. In the operation by lateral flaps, cutting around the great trochanter, whether effected in making the first flap as by Lisfranc's method, or in the last, as by that of Larrey, is a clumsy process in the most skillful hands. The descriptions of these operations read smoothly enough in the books, but they are far more difficult in execution.

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* "I consider the success of the operation to depend very much upon the quickness with which it is performed, (not only on account of hemorrhage, but) to avoid the shock the constitution receives from the continued exposure and irritation of so large a surface in the immediate vicinity of the trunk of the body." (*Guthrie.*)

Dr. Mott performed a modification of Larrey's operation by lateral flaps, previously tying the artery in the groin, a measure now generally considered unnecessary. I have in years past repeatedly assisted him in performing this operation upon the subject, but with all his tact in such matters, the superiority of the method was not so striking as to induce me to follow it without further investigation, and I was exceedingly gratified to hear him express the opinion that if he ever had occasion to repeat the operation, he should adopt the process which I have described.

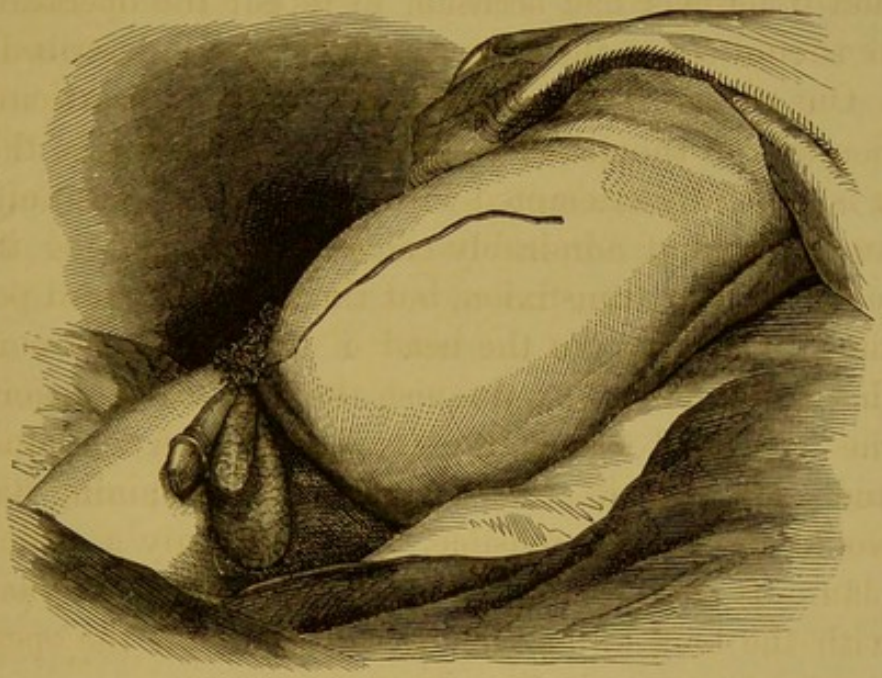
One principal cause of the difficulty in disarticulation and in the detachment of the trochanter is, that it is generally attempted with the long hip-joint knife, an instrument admirably calculated for making the large flaps by transfixion, but the most awkward possible for cutting out the head of the bone, or around the trochanter. To relinquish the long knife, disjoint the bone, and detach the trochanter with a scalpel, and then resume it to complete the remaining flap, would be a more sensible, but necessarily a tedious plan. It would certainly be better to make the flaps with the long knife, and then to complete the operation with an appropriate instrument.

Both of these advantages are secured by the method described; and moreover, in it there is no necessity, as in the ordinary operation by antero-posterior flaps, of transfixing the thigh so very near to Poupart's ligament, for as the bone can be disarticulated with an appropriate instrument, and always with certainty and celerity, it is no longer required to expose the joint so extensively in the first incision, which is the only object gained by entering the point of the knife

an inch below the anterior superior spine of the ilium.

In conclusion, I would state my belief, from repeated trials, that the operation described above could be invariably done in less than a minute by the most unpracticed hand at all accustomed to surgical operations, and by a little practice in less than half the time mentioned, as was the case in my patient.

Fig. 3.



The stump, you will perceive, is well formed, sufficiently full, and in every respect answers its purpose well. (See wood-cut.)

The patient, whose case is described above, recovered without further delay from the amputation at his hip-joint, and returned to the country, where he enjoyed excellent health for two years. He then began to suffer pain in the stump, which increased for several months, and finally brought him to the

city for advice. I recognized a return of the bony growth in the os innominatum of the side from which the lower extremity had been removed, involving the acetabulum and neighboring parts. This continued slowly to increase, causing pain similar in character to that formerly experienced. Finally, symptoms indicating pressure upon the rectum and bladder gradually appeared, and increased in severity until death followed, at the end of five years from the date of the last operation, from intestinal obstruction, resulting from pressure of the intra-pelvic growth upon the rectum. The parts were removed after death, and sent to the city for my inspection. The whole os innominatum was involved in an enormous outgrowth, similar in character to those already described, presenting no new appearances which could be recognized as malignant. I was informed by the physician who made the autopsy that he discovered no evidences of disease in any other organs of the body, the immediate cause of death being peritonitis.*

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* *Immense Exostosis of Femur—Amputation at the Middle of the Thigh—Return of Disease, and subsequent Amputation at the Hip-Joint, followed by Recovery.*—Dr. Van Buren exhibited the upper half of the femur of a man, forty-three years of age, which he had recently removed by amputation at the hip-joint, presenting a specimen of a peculiar form of exostosis. Dr. Van Buren recalled to the recollection of the members that nearly two years ago he had laid before the Society a very large bony tumor, weighing some ten or eleven pounds, involving the condyles and lower portion of the femur, which he had removed by amputation at the middle of the thigh. The patient recovered from this operation, and enjoyed excellent health for about a year, when pain was again experienced in the stump, which was ascertained to depend upon the return of the bony growth in the remaining portion of the femur. This increased rapidly, and at length caused such excruciating agony as to render the removal of the disease absolutely necessary, which, from its extent, could only be effected by amputation at the articu-

lation. This was accordingly done on the 21st of March, and the patient was thus far doing well.

The specimen at present before the Society was therefore the remaining (upper) half of the diseased femur, the lower half of which had been formerly exhibited. It was evidently a disease of the bone of the same nature, viz., of the osteo-cartilaginous variety of exostosis, as described by Nelaton, (*Elemens de Path. Chirurg.*, Paris, 1847, t. ii. p. 3,) Cæsar Hawkins, (Lect. on Tumors of Bones, *Lond. Med. Gaz.*, new series, vol. i. p. 475,) and Cruveilhier. The irregular outlines of the diseased mass resembled the spicular form of exostosis described by Astley Cooper, in his paper on exostosis, while its surface was covered, beneath the periosteum, by a layer of cartilage, varying from one to five or six lines in thickness, verifying accurately the description of Nelaton. The substance of the tumor is not at all dense, resembling more, within, the cancellated structure of healthy bone.

The return of the disease might lead to the suspicion of its malignant character, but its very slow growth, (nineteen years,) its painlessness, except from tension of the nervous trunks, and its anatomical characteristics, would seem to confirm its character as a simple exostosis of the variety described. The specimen first obtained has been macerated since its first exhibition to the Society, and its present appearance entirely confirms this opinion.

There is a case of bony tumor involving the lower part of the femur, resembling very closely the case now under consideration, reported by Boyer, (*Traité des Mal. Chirurg.*, t. iii. p. 598, Paris ed., 1831,) in which the disease is denominated *Osteo-sarcoma*. The patient survived eighteen years after its removal by amputation. The term osteo-sarcoma has been applied indiscriminately to the rarer varieties of exostosis, as well as to cysts, hydatids, fibrous, cartilaginous, and cancerous tumors developed in bone, and has consequently lost any pathological signification that it ever possessed; and it is probable that, as our knowledge of minute structure is increased by greater familiarity with the microscope, many other terms at present employed in surgical pathology will also fall into disuse from the vagueness of their signification.

Cruveilhier, in the 34th *livraison* of his magnificent illustrations of morbid anatomy, pictures and describes specimens of still another variety of osteo-cartilaginous exostosis, and expresses the opinion that Boyer's case was merely another phase of the same disease.

(Plates were exhibited to the Society from the works of Crûveilhier and Boyer, illustrating the different varieties of exostosis.)—(Report of Proceedings of New York Pathological Society. *New York Journal of Medicine*, vol. v., 1850.)

II.

COMPOUND COMMINUTED FRACTURE OF THE FEMUR NEAR THE GREAT TROCHANTER, WITH EXTENSIVE LACERATION OF THE SOFT PARTS—AMPUTATION AT THE HIP-JOINT—DEATH.*

Eliza Reid, æt. 9, was admitted into the New York Hospital on the 5th July, 1853, two hours after being run over by a railroad car, which produced a compound comminuted fracture of the femur, and extensive laceration of the anterior portion of the thigh, the wound extending from two inches below Poupart's ligament to the knee-joint. No pulsation could be felt in the anterior tibial artery. There was considerable vomiting before admission. Reaction having taken place, a consultation was called and amputation at the hip-joint advised, Drs. Cheesman, Buck, and Markoe being present. At ten o'clock P.M., the patient being placed under the influence of sulphuric ether, the operation was performed by antero-posterior flaps, and the wound brought together as rapidly as the safety of the patient would admit. Very little blood was lost during the operation. The patient vomited during the administration of the ether, ejecting some half-digested food which had been taken before the accident. The shock of the operation was excessive; but in two hours the patient had completely rallied under the careful use of stimulants, and, all circumstances being considered, passed a comfortable night.

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* From the New York Journal of Medicine, vol. xii., (new series,) p. 151.

The condition of the patient appeared promising until the morning of the 7th, when the pulse began to grow more frequent and feeble, and slight delirium was noticed. From this time she gradually sank, and died at two o'clock P.M., forty-six hours after the injury, and forty-two after the operation.

The fatal issue in this case was attributable mainly to the excessive depression of the powers of life which always follows railroad injuries. The child rallied from the fearful injury she had received, and also rallied well after the operation; but sank in the effort at reparation. A post-mortem examination showed union already partially effected in the stump, and no internal injuries were detected. The mode of operating adopted in this case was that which had already been performed by the attending surgeon in a case followed by recovery; the posterior flap being made by an incision from without inward.

III.

PRIMARY AMPUTATION AT THE HIP-JOINT FOR COMPOUND FRACTURE OF THE THIGH INVOLVING KNEE-JOINT, WITH COMPOUND FRACTURE OF OPPOSITE LEG.

LAWRENCE MORTON, æt. 25, born in Ireland, laborer, was admitted into the New York Hospital, August 22d, 1855, in a state of great prostration from injuries sustained about two and a half hours before (twelve M.) by being crushed in a railroad car, which was thrown down an embankment. There was found double fracture of the left femur: one extend-

ing horizontally through both condyles; another at the upper part of the middle third, with a lacerated wound on the lower part of the outer aspect of the thigh, four inches in length by two broad. Through the lower angle of the wound over the external condyle a finger could be passed and moved freely around the joint, the cavity of which was also exposed. A small wound was also found on the posterior aspect of the limb, large enough to admit a little finger, and communicating directly with the upper fracture, and from which there was also considerable hemorrhage. The upper third of the segment was quite distended and tense from extravasated blood. No ecchymosis over the pelvis, nor evidence of its fracture. There was likewise a compound fracture of both bones of the right leg, at the junction of the middle and lower thirds; the wound directly over the seat of fracture on the front aspect of the tibia was about half an inch long, and closed up accurately when the limb was brought into its natural position.

TREATMENT.—Both limbs placed in fracture-boxes; the oozing of blood stopped by compresses of lint and bandages applied from below upward; brandy and carb. ammon. were given freely. Reaction did not set in until after an hour had elapsed. Consultation was held at nine P.M.; but the patient's condition was not such as to warrant any interference, though decidedly better than when admitted. Stimulants were taken as ordered during the night; in the earlier part every hour, and later every two hours: they were omitted in the morning early, but resumed at ten A.M., when it was found that he had rallied considerably; but the pulse

was still wanting in force. On consultation at noon, immediate amputation was determined upon; but the place at which it was to be done was left to be decided by the result of an examination made while the patient was under the influence of the anæsthetic. The injuries were found to be so extensive, that there seemed to be no alternative save amputation at the hip-joint. The operation differed from the usual method in that the posterior flap was made by cutting from without inward. Owing to sinking of the pulse while the patient was yet on the operating table, the use of the ether was suspended and stimulants given. After the operation, the patient became so restless as to be quite unmanageable, complaining of great thirst, etc. Brandy and ice-water were given, with brandy and water per rectum, every half hour. Patient died six hours after the operation.

No autopsy could be obtained.

In this case the operative process was satisfactory in regard to ease and rapidity of execution and control of hemorrhage; but, like all primary amputations at the hip-joint, almost of necessity fatal.

CASES

OF

TRACHEOTOMY.

WITH OBSERVATIONS.*

The following cases, in which the operation of tracheotomy was required, occurred through the contingencies of practice, in rapid succession, within the space of a few weeks.

As the true value of any surgical operation can only be arrived at by comparing and digesting the result of a large number of instances in which it has been performed, it would seem to be the duty of individuals to place upon record plain and truthful accounts of such cases as fall within their observation, in order that each may contribute his mite to the mass of experience from which only correct final results can be deduced. The present cases furnish also, as far as I am able to judge, examples of the most ordinary termination of the operation under the several circumstances detailed; and for these reasons, therefore, I have ventured to bring them before the notice of the Academy.

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* From the Transactions of the New York Academy of Medicine, vol. i. p. 105. Read April 3d, 1850.

I.

FOREIGN BODY IN THE AIR-PASSAGES—TRACHEOTOMY—SUCCESSFUL RESULT.

JAMES GALLAGHER, a healthy child, three years of age, had been eating preserved plums, for which his father was about to correct him, when, as he commenced crying, he was suddenly seized with a violent strangling cough, which seemed to threaten suffocation.

The father, very much frightened, caught the child up in his arms, and started for the office of the nearest physician. On getting into the open air, in the course of a few minutes he began to breathe a little more freely, still, however, coughing violently at very short intervals. At first he kept his hand almost constantly at his mouth, saying, in an *altered voice*, "that he was choking," and endeavoring to get his fingers, from time to time, back into the fauces. While he was carrying the child, his father, to use his own words, "heard something distinctly *clicking, with a sound like a valve*," in his throat, and even thought that "he felt it moving up and down in his neck, striking," as he said, "both ways." As it came up it would seem to excite the cough: this was quite shrill, and resembled in tone that of a croup, with an occasional whoop in the inspiration; it often ended by gagging.

The physician consulted discountenanced the idea of there being anything in his windpipe, and treated the child as for croup. At the end of fourteen days, however, the symptoms still continuing urgent, the father determined to bring him to the city, from the

country village where he resided, and I first saw the patient on the 5th Sept. 1848.

At this time, according to his father's account, he had been coughing at intervals, varying from half an hour to two hours, just as badly as at first, ever since the day of the accident. He had been uniformly worse at night, and always about eleven o'clock P. M. had his most severe and long-continued spell of coughing, which, in fact, would continue almost uninterruptedly until morning, when from sheer exhaustion he would fall into an uneasy slumber His voice had been unnatural from the first day of the accident, and while awake there had been a constant whistling in the throat in breathing, although during sleep it would sometimes be perfectly natural. He had always, since the commencement of the sickness, swallowed both solids and fluids without complaint, and apparently with perfect ease.

On examination I found the child with a pallid look and anxious expression of countenance, and exceedingly fretful. His face, especially about the eyes, was puffy and œdematous; skin cool and moist; and pulse more rapid than natural.

On percussion, an equal degree of resonance was found on either side of the chest, and it was everywhere normal. The respiratory murmur was natural in every part of each lung, mingled with a slight coarse mucous rattle, and the resonance of the laryngeal stridor. Over the trachea and larynx there was heard a whistling sound, equal in inspiration and expiration, such as would be produced by any cause diminishing its natural caliber. Pressure on the thyroid cartilages always gave pain, and generally excited

a paroxysm of the suffocating cough. No clicking sound could be heard in the trachea. My conclusion was that the child had a foreign body, probably a plum-pit, in the air-passages, either in the trachea, or impacted in one of the ventricles of the larynx; that the bronchi were free.

This opinion was communicated to the father, and the operation of tracheotomy recommended to be performed, at as early a period as possible, as the most certain means of relief.

After consulting with his friends, the father determined to submit his child to the operation, and it was accordingly done on the next day, (6th Sept.,) the fifteenth from the occurrence of the accident.

Dr. Mott, who was present with Drs. Batchelder and Metcalfe, and a number of students, also examined the patient before the operation, and recognized the presence of a foreign body.

I determined to employ chloroform, which was kindly administered by Dr. Metcalfe; the child having been deprived of food for some hours before the operation, with the view of lessening the chance of vomiting under the influence of the anæsthesia.

The patient having been placed in a proper position, an incision two inches in length was made, extending from the upper edge of the cricoid cartilage to within three-quarters of an inch of the sternum, involving the skin, fatty layer, and cervical fascia. Immediately beneath this latter, and involved in its meshes, were a number of large veins, which were only avoided by careful dissection, and by pushing them on either side; this exposed the isthmus of the thyroid gland, which was divided, with the deep

fascial layer surrounding the trachea, and the tube was thus laid bare. After arresting the trifling hemorrhage, an opening was then made into the trachea about its sixth or seventh ring, which was enlarged upward, with a probe-pointed bistoury, as far as its first ring. A slight cough now came on, by which the air was expelled with considerable force, at each expiration, through the opening, when, before two minutes had elapsed, two foreign bodies were spontaneously discharged: one, the shank of a plum stem, lodged in the external wound; the other, a watermelon seed, of the largest size, was projected quite forcibly to a distance nearly a yard, toward the child's feet. The opinion was expressed by Dr. Mott that the seed evidently came from above, *i.e.* from the larynx.

From the moment of the expulsion of the seed it was noticed that the child's breathing became perfectly free and natural, the whistling and the peculiar cough recurring no more.

Within a few minutes the edges of the external wound were brought together without inconvenience, and retained by sutures and plaster. Through the opening by which the ligatures were brought out, air was still, however, expelled on coughing, though slightly and in small quantity.

The child was kept insensible until the dressings were completed, a period in all of fifty-five minutes, and he was then carefully covered, and allowed to sleep without the slightest disturbance. No vomiting occurred.

At the expiration of an hour his manner was perfectly natural and quiet, with a strong disposition to

sleep, occasionally coughing and fretting slightly, but easily quieted. Pulse 132, natural; breathing easy and natural; skin pleasantly cool and moist.

From this time the case progressed favorably in every respect. The wound healed mainly by the first intention, no air escaping from it after the seventh day, and on the thirteenth day after the operation the child was taken home to the country perfectly well.

The case related above was especially interesting to me at the time, on account of the admirable manner in which the chloroform facilitated the performance of an operation which, upon a young child, is always more or less vexatious and troublesome.

When the question arose as to the propriety of its administration in an operation upon the air-passages, I was not aware of any precedent in its use under such circumstances, but foreseeing no objection worthy of consideration, I did not hesitate to employ it; and the result was in every respect gratifying. A few days afterward, however, I encountered the report of an exceedingly interesting case in the *Western Lancet* for May, 1848, in which tracheotomy had been successfully performed upon a child four years of age by Dr. W. Davidson, of Madison County, Indiana, for the removal of a grain of Indian-corn; chloroform was employed by Dr. D., with the happiest effects. "No one," says he, "but he who has operated upon the trachea, with and without chloroform, can sufficiently appreciate the value of this agent in tracheotomy." I take pleasure in stating also that a case has occurred recently in the practice of Dr. J. Kearny Rodgers, of this city, in which this eminent surgeon re-

moved a cherry-pit from the trachea of a child seven years of age, under the influence of chloroform, in which the result was equally gratifying.

These cases, which prove that anæsthetic agents may be employed with safety in operations upon the air-passages, are the more satisfactory as they serve to dispel the objections urged against their use under these circumstances by a high European authority. Professor Miller, of Edinburgh, in the last edition of his "Principles of Surgery," under the head of "Surgical Experience of Chloroform," expresses the opinion that "in the case of tracheotomy on account of a foreign body in the windpipe, anæsthesia must plainly be abstained from," on account of "the transcendent risk of suffocation by unejected and accumulated blood."

Experience has thus far shown, in America, that the risk of suffocation in tracheotomy is not so great as was anticipated, and it furnishes us with good reason to hope that a more extensive observation will demonstrate the safety of the employment of chloroform in this as in other operations.

II.

SYPHILITIC ULCERATION OF LARYNX—THREATENED DEATH FROM SUFFOCATION—TRACHEOTOMY—RELIEF.

Andrew Wheeler, a moderately robust and healthy-looking man, thirty-three years of age, with depression of the bones of the nose, apparently from syphilitic disease, was admitted into Bellevue Hospital, in Sep-

tember, 1848, complaining of sore-throat, with great difficulty of breathing, and complete aphonia.

On first entering the ward in which the patient had been placed, I was struck by the peculiarity of his breathing, and on examining into his symptoms I was soon convinced that he was in imminent danger of death from suffocation. As far as could be learned, under circumstances so unfavorable for an accurate diagnosis, his sore-throat was of some months' duration, but the serious obstruction to the breathing had existed only about three weeks, and had been gradually increasing, with occasional paroxysmal exacerbations, and for the last two nights he had been able to get no sleep whatever. Expiration as well as inspiration was accompanied by a whistling sound, as of air passing through a very narrow opening, and it was effected with much exertion, as in a paroxysm of asthma. His expectoration was copious in quantity, and accompanied with very considerable choking and strangling; it consisted of tough, thick, yellowish masses, occasionally streaked with blood, and partly sinking in water. His breath exhaled a gangrenous odor, in which that of dead bone was very evident. Pressure of the thyroid cartilage caused pain. On passing the finger back into the fauces, ulceration and partial destruction of the epiglottis was readily recognized.

On auscultation, the respiratory murmur could be heard throughout the chest, but more obscurely than natural. The resonance of the chest was normal.

After a partial consultation, it was decided to try the effect of an emetic, and in case it failed to afford relief, to have immediate recourse to the operation of tracheotomy.

At the end of an hour, I was summoned in haste by the house surgeon, and found the patient laboring under still greater difficulty of breathing than before, and presenting an aspect of the most intense anxiety; large drops of sweat stood upon his forehead, his face was pale and earthy, his lips livid, and his hands and wrists purple from stagnation of the capillary circulation and imperfect aeration of the blood. The pulse was frequent, corded, and slightly irregular; and he was constantly shifting his position, and making signs indicating his urgent desire for relief.

I sent at once for the medical gentlemen of the house, and proceeded to perform the operation on the spot, in the usual manner, the four or five upper rings of the trachea being divided.

The relief to the patient was immediate and striking; the lungs once more played freely, the aspect of the countenance and the color of the hands became natural, the intense anxiety of manner disappeared entirely, and while we were yet engaged in caring for the wound, the patient fell asleep. Not having a tube of proper size at hand, I kept the edges of the tracheal wound asunder by passing a ligature through each, and tying their ends over a forked stick about two inches in length. This arrangement answered its purpose well; the patient passed a comfortable night, expectorating at intervals freely through the wound. On the next day a tube was introduced about three and a half lines in diameter, which was borne without discomfort.

On the fourth day this tube was removed for the first time, and another introduced; the one removed was perfectly black, excepting the portion of it out-

side of the wound. The patient was doing admirably; since the operation his pulse had not exceeded 90, the amount and character of the expectoration remaining about the same. On the twelfth day, the tube having been changed meanwhile, as occasion required, I removed it for the purpose of exploring the interior of the larynx through the wound. On the posterior surface of the windpipe, just above the wound, I discovered with the probe a portion of bone, which had become almost detached from its connections, and was on the point of falling into the trachea, when I caught and removed it with the forceps. It was about the size and shape of one of the *ossa nasi*, and evidently a portion of the posterior part of the ossified and necrosed cricoid cartilage.

This then was evidence of the nature of the disease of the laryngeal cartilages, and accounted for the odor of diseased bone and the discoloration of the silver tube. Other ossified points were also detected by the probe, which was passed up through the glottis into the throat. On stopping the external orifice of the tube with the finger, after it was replaced, he could, for the first time since the operation, force air through the glottis, and made an audible noise in so doing.

For some time after this date, Wheeler's condition continued to be very comfortable; constitutional treatment was employed for the syphilitic disease of the larynx, from which he seemed to derive benefit; his appetite was good, and his general health improved. His respiration remained free, but he was much annoyed by the viscid expectoration by which the tube was frequently obstructed. This was changed and cleaned daily, being immediately replaced on removal by a duplicate tube of the same size.

During the sixth week an accident occurred which was near proving serious in its results. On removing the tube one morning, as usual, the clean one happening to be mislaid, a delay occurred in its reintroduction of certainly not more than half an hour, when the house surgeon was much disconcerted to find that, from the contraction of the tracheal opening, he was unable to get it back into its place, even on making use of some force. I was summoned in haste an hour afterward, and found the patient on the eve of suffocation; the opening had rapidly contracted to a very small size, and his symptoms were even more urgent than when the trachea was opened at first; his distress in breathing was agonizing, and the by-standers were expecting every inspiration to be his last. Without a moment's delay I introduced a curved probe-pointed bistoury, and freely enlarged the opening downward, making sufficient room for the ready introduction of the tube, and he was again entirely relieved.

This incident in the case is instructive, as showing the singularly rapid contraction liable to occur in wounds of this character when disposed to heal, and prevented from doing so by artificial means.

Soon after this circumstance Wheeler passed from under my care, and I was unable to see him except on one or two occasions. I learned that his expectoration became more and more difficult, and that he was constantly worried by a harassing cough; hectic fever supervened, with diarrhœa, and he died, worn out and exhausted, about four months after the operation, wearing the tube and breathing with freedom to the last.

The larynx was sent to me after his death, and is now in my possession.

The points from which the ossified portions of the cricoid cartilage had exfoliated presented deep but perfect cicatrices; the ulcerations of the epiglottis had healed entirely; and in fact above the artificial opening into the trachea there was no evidence of disease to be found which had not been thoroughly repaired.

Below this point, however, the trachea was the seat of numerous circular ulcerations involving its whole mucous lining, and exposing its cartilaginous rings at numerous points; they were mostly about half an inch in diameter or more, some of them running into each other, and others solitary, and extending fully to the bifurcation of the trachea.

Beyond this point there was evidence of rather intense bronchitis throughout the larger bronchial ramifications, but no further.

The preparation illustrates admirably the beneficial influence of the operation of tracheotomy in disease of the larynx, by placing the organ entirely at rest, and thus allowing the reparative process to go on undisturbed.

III.

CROUP—TRACHEOTOMY—FATAL RESULT.

On Tuesday, the 2d November, 1848, I was called early in the morning to see a son of Mr. C. B., 86 Madison Street, in consultation with Dr. Conway.

The child, about three years of age, and moderately

robust, had been attacked on the Sunday morning previous with symptoms of croup, for which he had been appropriately treated, and it was not until Monday evening that his breathing became permanently affected, and his condition was considered alarming. He was then leeched around the throat, and took calomel and antimony, by which he was temporarily relieved, but his symptoms shortly returned with increased violence.

On Tuesday, at nine o'clock A.M., I found him with a pallid aspect, a pulse of 130, and breathing with considerable difficulty. There was no duskiness of the complexion, or lividity of the lips.

I proposed to apply the nitrate of silver to the larynx, at twelve o'clock, and that the fumes of cinnabar should be employed in the mean time. At this hour I found the child no better; some tough viscid material had been expectorated with temporary relief, but there was now occasional duskiness of the skin and lividity of the lips.

I proceeded to apply a solution of the nitrate of silver, (℈ij–℥i,) with a sponge and whalebone of appropriate size, to the interior of the larynx. This was done thoroughly four times, at intervals of from five to ten minutes. No irritation or distress of consequence was produced by the application, and but one fit of coughing, by which nothing was discharged.

I proposed to open the trachea at four o'clock P.M., if no relief should be obtained before that time. This was agreed to, and before the hour arrived I was summoned to perform the operation at once, as the child was thought to be sinking more rapidly. I found him weaker, but with no additional symptoms,

save an occasional wildness of manner, and the slightest possible convulsive twitching of the extremities. The dark tint of the countenance was also more marked.

With the consent of all parties, and at the urgent desire of the father, I proceeded to open the trachea, which was done in the usual manner, four of its rings being divided immediately below the isthmus of the thyroid gland.

After the momentary annoyance of the operation had passed off, the breathing became much more free, and the face and lips resumed their natural complexion; the child asked, as well as he could, for drink, which he swallowed with avidity, and also for food, which was given in small quantities.

A tube was introduced, and the patient was placed in bed with a good pulse.

He continued to breathe freely, with occasional uneasiness, and slept mostly for two hours, when, without any warning, while his father was listening to the sound of his breathing, and congratulating himself upon its perfect freedom, it suddenly ceased, and before he could get to the bedside, the child was dead.

No obstruction whatever had occurred in the tube; this had been carefully watched by two of my students who had remained with the patient for the purpose.

No post-mortem examination could be obtained.

CASES

OF

INGUINAL ANEURISM.

WITH REMARKS.*

I.

TRUE INGUINAL ANEURISM—ATTEMPT AT MANUAL COMPRESSION OF THE EXTERNAL ILIAC ARTERY—SUBSEQUENT LIGATURE OF THE ARTERY—CURE.

Mr. S. B. H., of Tarrytown, N. Y., twenty-five years of age, and of robust constitution, came to the city and placed himself under my care in July, 1848, with an aneurism in the right groin about the size of an orange.

In the month of March, 1848, Mr. H., whose health had previously been excellent and uniform, was accidentally jammed between the wheel of a carriage and a gate-post, the wheel striking the buttock and forcing the groin against the post; to save himself from being crushed as the carriage passed, he pushed backward with all his strength—so much so as to lift the wheel and force the carriage to some distance from the post. He was much bruised by the accident, and

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* From the New York Journal of Medicine and the Collateral Sciences, vol. ii., (new series,) p. 168.

limped for a fortnight afterward, at the end of which time he, one night in bed, accidentally discovered a pulsating swelling in the groin about the size of a hazel-nut.

From this period until he came under my notice the tumor had steadily increased, and during the three weeks previous it had almost doubled its size. It was situated immediately below Poupart's ligament, and presented a lobulated appearance; its contents were entirely fluid. Pressure upon the external iliac artery arrested the pulsations of the tumor and caused it to collapse. The aneurismal thrill was trifling. The patient was otherwise in perfect health.

On being informed of the nature of his disease and its only certain remedy, Mr. H. expressed his entire willingness to submit to the necessary operation.

During my examination of the tumor, I was struck by the ease with which its pulsation was controlled by accurate pressure of the trunk of the external iliac artery against the pubes; the force of one finger seemed almost sufficient to command it. This circumstance, with the recollection of the success recently attained by Prof. Knight, of New Haven, in the treatment of a case of popliteal aneurism by continual manual pressure applied by relays of assistants to the trunk of the femoral artery, induced me to think seriously of the feasibility of employing similar means in the present instance. Pressure by means of an instrument I was satisfied could not be borne; but the apparent practicability of this novel mode of applying it, with the remotest possibility of its success, led me to conclude that I should not be doing justice to my patient were I to neglect the chance, and I ac-

cordingly determined, while he was becoming accustomed to his new quarters, to give it a trial.

Having obtained the assistance of a sufficient number of my friends, whose devotion to their object certainly deserved better success, we commenced pressure with the fingers upon the artery about an inch above the crural arch, on the 1st of August, at twelve o'clock M., having previously evacuated the bowels and placed the patient upon a hard mattress, under the influence of digitalis, by which the pulsations of the heart were reduced to 45 per minute. It was thought better that cold should not be applied to the tumor. During the first eight or ten hours, the pressure was accurately kept up, and borne without complaint; some pain and restlessness then occurred, which was measurably relieved by morphia. At the end of twenty-four hours, although the pain was endurable, we found that much more decided pressure was required to restrain the pulsation in the tumor; this difficulty continued to increase as well as the pain, which became very severe, especially at the time of changing hands; and finally, at midnight on the 2d, after having been faithfully maintained during thirty-six hours, it was found necessary to discontinue the pressure.

The condition of the tumor was apparently unaltered. Some inflammation of the integuments followed at the point of pressure, which terminated in an impetiginous eruption, and two weeks elapsed before the parts were in a proper condition for the operation.

On the 17th of August, I applied a ligature to the external iliac artery, at a point about an inch and a

quarter above Poupart's ligament, adopting the operative method recommended by Mott. The patient was placed fully under the influence of a mixture of chloroform and ether, (equal parts by weight,) which was kindly administered by my friend, Dr. Metcalfe, who was present, with Professors Mott, Parker, Dr. J. P. Batchelder, and a number of medical gentlemen. The anæsthetic influence was perfect, and the operation, consequently, performed without the slightest delay. I was particularly struck by the entire immobility of the abdominal muscles, whose almost constant and involuntary motions are so apt to annoy the surgeon during this operation.

The slightest possible chill and fever followed within the first twenty-four hours, after which no morbid symptoms occurred. Adhesion took place in the wound, without any evidence of local inflammation.

The limb retained its natural sensibility, but became about 5° colder than its fellow, which difference in temperature has persisted, with very little diminution, to the present time. The ligature came away on the 17th day, and the slight fistulous opening left by it was entirely closed by the expiration of the third week. At the end of the sixth week, the tumor had diminished to the size it possessed when first discovered, and my patient left the city well satisfied with his condition. At this time I could discover no pulsation in either of the tibial arteries, although they could be felt to be tense and apparently filled with blood.

The only point of particular interest in connection with this case is the attempt at treatment by

compression, applied to the external iliac artery by manual pressure, which, as far as I am informed, was not warranted by any precedent. There is a case on record, to which I am not at present able to refer, in which instrumental pressure was successfully applied to this artery for the purpose of restraining hemorrhage; it was sustained for some time, and although its object was attained, an extensive eschar followed. In 1816, Dupuytren tried systematic pressure, applied half an inch above the crural arch, in a case of inguinal aneurism, by means of an instrument similar to those at present in vogue, the sacrum being taken as the point of counter-pressure. A second instrument, on the principle of the ordinary spring truss, was also employed in the same case. Both attempts were unsuccessful, from the inability of the patient to bear the pain of the pressure, and the disease was subsequently cured by ligature of the artery. (*Leçons Orales*, Paris, 1834, t. iii. p. 540.)

The failure in the present instance is attributable to the amount of pain produced by the pressure—to the consequent swelling of the parts situated over the artery—and principally to the spasmodic action of the lower portion of the internal oblique and transversalis muscles, which rendered it extremely difficult to prevent the artery from rolling beneath the fingers, and thus escaping from even an increased amount of pressure. The first obstacle is not an insuperable objection; my patient bore the pain well, and could have borne it for a longer time; the two latter seem to be inherent in the method employed. With these difficulties in view, however, I should not entirely despair of success by this method in a thin subject moderately

tolerant of pain. In any case, the attempt could not exert other than a favorable influence upon the success of the subsequent operation by throwing the stress of the circulation temporarily upon the anastomosing branches, and thus contributing to their enlargement, an object which can never be regarded as entirely unnecessary, inasmuch as gangrene follows this operation sufficiently often, even under the most favorable circumstances, to keep the surgeon ever alive to its danger.*

There are several cases on record, of inguinal aneurism, in which pressure applied directly to the tumor has succeeded in curing the disease.

Dr. Albers (*Med.-Chir. Trans.*, vol. ix.) relates a case in which, the patient having refused to submit to an operation, pressure was applied to the tumor by means of a pad and screw; at first it could not be borne on account of the pain, but it was afterward continued more moderately for a period of seven months, at the expiration of which time the disease was found to have been cured. The same surgeon relates a second instance in which pressure was continued for *six years* without success; some benefit must, however, have followed the remedy in this case, as the disease would not probably have continued so long a time without a fatal result if it had not been employed.

Dr. O'Bryan Bellingham (*Dublin Quart. Jour.*, vol. xxii.) employed pressure by means of straps and bandages with a good result for an aneurism of the external iliac artery for which he had previously applied a ligature to the same vessel,† the disease having reappeared a year later.

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* See note, p. 29.

† This case is incorrectly stated by Mr. Crisp (Dis., etc. of Blood-

A case is recorded in the *Lond. Med. Gaz.*, 1845, in which Mr. Luke succeeded by the same means in curing his patient; and a similar instance of success was obtained by Mr. McCoy, of Dublin. (*Dub. Med. Press*, vol. ix.)

These cases, which are of course exceptional, deserve, nevertheless, to be borne in mind, in connection with those treated by compression during the last century by Guattini. They serve to exemplify the value of a resource which, although rendered comparatively unnecessary by the brilliant operation of Abernethy, might prove, under certain circumstances, of immense utility to the surgeon.

The following case, which, by the kindness of Dr. Mott, I am permitted to record, presents points of more decided interest in the unusual nature of the disease and its melancholy termination, and especially in connection with the important question of surgical practice which it involves.

II.

ARTERIO-VENOUS ANEURISM NEAR THE GROIN—LIGATURE OF EXTERNAL ILIAC ARTERY—DEATH FROM GANGRENE.

Mr. H. C. O., of Barbour County, Alabama, twenty-one years of age, of slight build, and previous good health, received in an affray in the month of July,

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vessels, Lond., 1847, p. 249) to be the first on record, in which the external iliac has been tied for aneurism of this vessel. The case of our countryman Dr. Jameson, of Baltimore, (vide Philad. Med. Recorder, 1822, vol. v. p. 118,) has the precedence by twenty years.

1844, a wound from a pistol ball, which entered about an inch and a half below the ant. sup. iliac spine on the right side, and, traversing the front of the thigh in a line directed obliquely downward and inward, lodged immediately beneath the skin on the inside of the limb, about two inches below the pubes. There was a great gush of blood at the time of the accident, which was, however, readily staunched by pressure, and did not again recur; the wound healed without difficulty under ordinary treatment, the ball being removed by incision.

Shortly after his recovery, a pulsating tumor was discovered just below Poupart's ligament, over the track of the femoral vessels.

Early in December, 1846, he arrived in New York to place himself under the care of Dr. Mott. At this time there was a general enlargement of the upper fourth of the thigh, with considerable induration, and over a space some three and a half inches in diameter, in the position described above, a strong aneurismal pulsation was felt, accompanied by a very distinct and peculiar *purring* thrill. There was no marked prominence at any point constituting a distinct tumor. Pressure upon the external iliac artery arrested the pulsation and thrill in the tumor. At the point where the femoral artery enters the tendon of the *adductor magnus*, its pulsation could be felt perhaps more distinctly than usual, but without any perceptible thrill. On the upper part of the thigh there were a number of enlarged superficial veins, and at several points below were patches of permanently distended capillary vessels. There was also a small ulcer on the leg of two months' standing. Some numbness and weak-

ness of the limb were complained of, which rendered active exercise inconvenient.

On the 16th of December, at two o'clock P.M., a ligature was applied to the external iliac artery by Dr. Mott, with the immediate effect of stopping all pulsation in the tumor. The operation, although its details were executed in the most perfect manner, was badly borne by the patient, who was laboring under much nervous excitement, and exceedingly sensitive to pain. Some prostration followed, a good deal of pain was complained of in the wound, and a sensation of numbness throughout the limb. The patient was conveyed to bed; the limb, whose temperature had diminished considerably, was enveloped in carded cotton, and a full anodyne administered. At seven o'clock P.M., there was still much pain complained of, with anxiety and restlessness. Pulse 56; very small. The limb was seven or eight degrees colder than the sound one, and there was no sensibility on pinching smartly the inside of the calf. Bottles of hot water were ordered to the limb outside of the cotton, and twenty drops of Magendie's solution of morphine to be given immediately.

December 17th, half-past one o'clock P. M. The patient had dozed uneasily through the night, with less complaint of pain, and was still somewhat under the influence of morphine. He complained of vague, dull, tensive pain about the lower part of the abdomen. Slight oozing had occurred at the wound of bloody serum; the limb had become warmed from the contact of the hot bottles, but there was no sensible increase of its natural heat, and no evidence of sensibility. There was a mottled, purplish appear-

ance about the foot. Pulse 64, weak and quick, although less feeble than the night before. An enema of catnip tea was directed, with anodyne if required.

On the 18th, at half-past one o'clock P.M., he complained of pain in the abdomen on motion, with a sensation of internal heat and great weakness. The tongue was moist and whitish; the skin natural; pulse 76, rather fuller, though weak, soft, and irregular in rhythm and force, with an occasional intermission. Stomach irritable. He had vomited in the course of the night, by which the oozing from the wound was increased. No pulsation could be detected in any of the arteries of the limb; its temperature was the same; the purple patches on the foot more marked. On pinching the skin of the leg to ascertain if it possessed the slightest sensibility, the cuticle gave way under the fingers.

On the 19th, at half-past one P.M., the patient no longer complained of pain; his pulse was 78, soft, and less irregular; the limb was cold, insensible, marbled in appearance, and vesicated at several points. There was much irritability of stomach, which a julep of ammonia and camphor had failed to relieve; weak wine-whey was substituted, which appeared to agree well.

December 20th, nine o'clock A.M. The patient was insensible except when aroused, and lay in a low muttering delirium. There was some jactitation; no hiccough; no tension of abdomen. Pulse 120, weak and irregular; tongue white and moist. The limb was livid and mottled, covered with bullæ containing bloody fluid; emphysematous crackling was felt on pressure, and its odor was extremely offensive. A solution of chloride of soda was applied on cloths.

On the 21st, at one o'clock P.M., patient comatose. Heart's action very weak and intermitting; no pulse at wrist. Hands and feet cold. The limb was in a state of complete sphacelus up to the wound, which was dry, black, and gaping.

He died on the 22d, at four o'clock A.M., the sixth day from the operation.

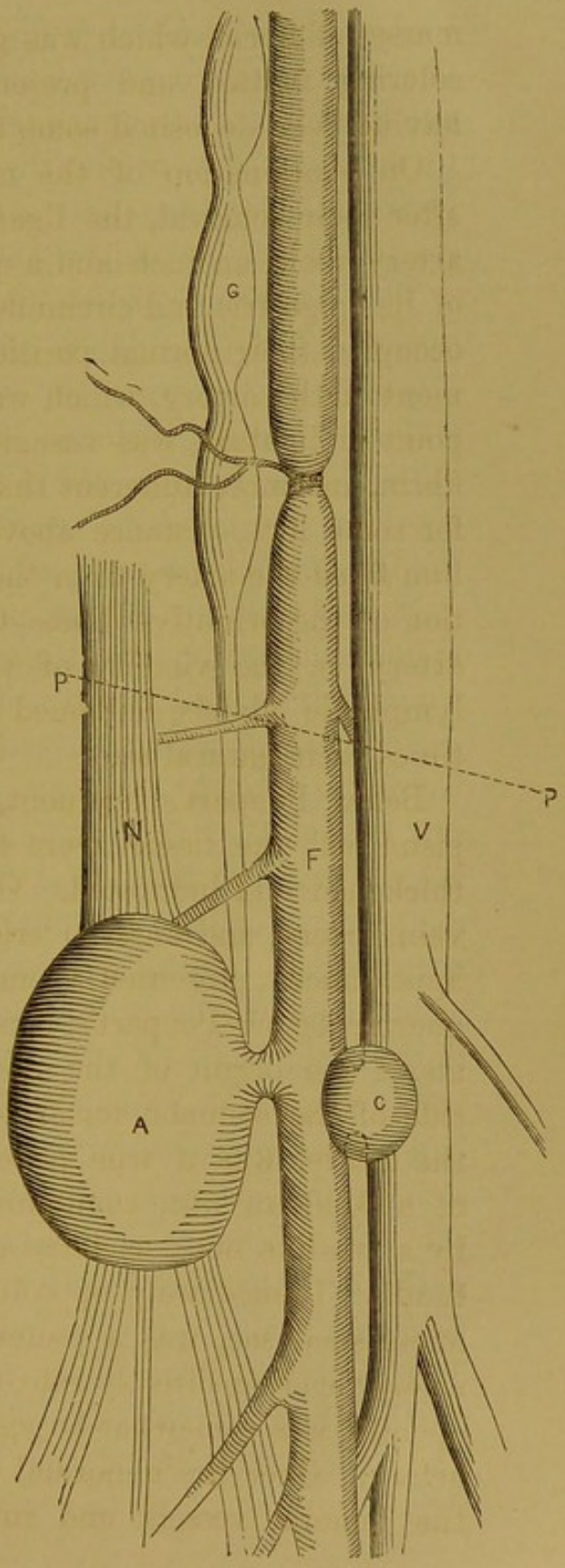
Autopsy at ten o'clock A.M. The whole surface of the body presented a very marked yellow tint. The wound of the belly formed the limit of the sphacelation above. I prolonged it four or five inches either way, and, carefully breaking down the fibrinous adhesions, which had already acquired some firmness, raised the abdominal parietes from the peritoneum, and exposed this membrane. For a space of three inches around the wound it presented marks of inflammation, viz., increased vascularity, and an irregular coating of fibrin on its surface; on opening its cavity, it was found elsewhere to be perfectly healthy. Through the wound thus made, I divided the aorta and vena cava just above their bifurcation, and detaching them from the psoas muscle and the internal iliac, I cut through the crural arch, and, tracing the vessels into the sphacelated mass below, removed a portion sufficiently large to include all the disease, which was placed immediately in spirits to harden for further examination. The other viscera examined, as well as the great vessels, were healthy, with the exception of the heart. It was somewhat enlarged; the walls of the left ventricle were one-third thicker than natural, and the *columnæ carneæ* presented a yellowish appearance at their termination in the *chordæ tendineæ*. The mitral valve was slightly contracted. All the four cavities of the heart contained

masses of fibrin, which was generally quite free from coloring matter, and presented the appearance of having been deposited some time before death.

On examination of the morbid parts, some days after their removal, the ligature was found upon the artery about an inch and a quarter above the origin of its epigastric and circumflex iliac branches, which occupied their normal position. The cellular investment of the artery, which was disturbed only at the point of ligature, was vascular, thickened by effused fibrin, and more adherent than natural to the vessels, for some little distance above and below. A coagulum filled the artery from the ligature to the bifurcation of the primitive iliac. On the outer side of the artery, in the vicinity of the ligature, were three lymphatic glands, inflamed and enlarged to three times their natural size.

Below Poupart's ligament, over the course of the pistol ball, the tissues were found to be considerably thickened and indurated. On carefully isolating the vein, artery, and anterior crural nerve, the following appearances presented themselves: an inch and a quarter below Poupart's ligament, and half an inch above the origin of the *profunda*, on the external side of the common femoral artery, and lying upon the nerve, was a true pouched aneurism, the size of a Madeira nut, communicating with the artery by a jug-like neck as large as the orifice of the profunda. Immediately opposite to the orifice of the aneurismal sac, was a preternatural opening in the artery, leading directly into the femoral vein. This opening was somewhat larger than the caliber of the artery. Over the abnormal communication between the femoral vessels, and involving apparently the

walls of the vein as much as those of the artery, was a second true aneurismal pouch the size of a rifle bullet, communicating with the vessels by a neck as large as the epigastric.* The walls of both of these aneurismal sacs contained a very considerable amount of calcareous matter, and in the cavity of the larger tumor were found layers of stratified fibrin. The walls of the vein, between the seat of the disease and Poupart's ligament, were thicker than those of the artery; below the disease the coats of the artery were thinner than nat-



* The wood-cut will convey a more definite idea of the position and relation of the parts implicated in the disease: The dotted line PP represents Poupart's ligament; F, the artery; V, the vein; N, the anterior crural nerve; A, the larger aneurismal tumor; C, the smaller tumor, beneath which the abnormal opening between the vessels is situated; G, one of the enlarged lymphatic glands.

ural. The vessels were otherwise normal. The anterior crural nerve was thickened, enlarged, and closely adherent to the larger aneurismal tumor. It is proper to mention that, before the operation, Dr. Mott expressed the opinion that a communication probably existed between the artery and vein.

The occurrence of arterio-venous aneurism in the upper part of the thigh is rather rare. Hennen mentions a case following the wound of a musket ball, and Hodgson an instance in which it was produced by a thrust from a red-hot poker; the remaining eight or ten cases on record were caused by punctured wounds by a cutting instrument.

It is a question of pathological interest as to the manner in which the disease was produced by the wound of the pistol ball. I cannot think that the artery was opened by the ball at the time of the wound, although the vein apparently was. From the evidence of the patient it could not be ascertained that the blood lost at the time of the accident was arterial in its character; from the readiness with which it was arrested by simple pressure, it would seem to have been entirely venous. A portion of the wall of the artery, as well as of the vein, was, most probably, deprived of life by the ball in its passage; and, on the separation of the slough, the arterial current forced a passage into the vein. There was no hemorrhage, either externally or into the cellular tissue of the limb at this time; and the external wound shortly healed. The arterial coats had, however, undergone so much alteration that in a little time they yielded, and the formation of the true aneurism was the

result.* We have thus in this instance the singular coincidence of true aneurism, from disease of the arterial coats, with a communication existing between the artery and vein.

A question now arises of more importance: what was the cause of the gangrene of the limb which followed the ligature of the artery?

The patient was young, moderately vigorous, of healthy constitution; and the disease had existed for two years and a half. The slight mitral contraction, and hypertrophy of the left ventricle, can hardly be taken into account. Under these circumstances, the danger of gangrene after ligature of the main arterial trunk of a limb, for simple aneurism of moderate size, is not great.† I am forced to the conclusion that, in the present case, the unnatural communication existing between the vein and artery was the main cause of its unfortunate issue; and this conclusion I shall attempt to justify.

In reviewing the surgical history of arterio-venous aneurism,‡ with the view of determining the results

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* That the aneurismal tumors involved the coats of the arteries alone there is no doubt; and in the larger tumor the internal lining of the artery is distinctly continuous with that of the sac. The fact is further confirmed by the bony deposit existing in the walls of both tumors; bony transformation being a rare consequence of inflammation except in the arterial tissue.

† Out of 155 cases of ligature of the external iliac, of which I have a record, gangrene of the limb has followed the operation for simple aneurism in sixteen cases. Dr. Norris (table showing the mortality following ligature of iliac arteries, *Am. Journ. Med. Sci.*, January, 1847) gives nine instances of gangrene occurring under similar circumstances, out of 118 cases.

‡ For the sake of brevity, I employ the term *arterio-venous aneurism* as including the different varieties of disease involving an abnormal communication between an artery and vein, as, in the present view of the subject, this circumstance is alone of importance.

which have followed the application of the Hunterian operation to its cure, I find a singular discrepancy existing between the opinions of authors and the recorded results of practice.

Hodgson (*Diseases of Arteries*, etc., Lond., 1815, p. 507) thinks it "probable that tying the artery above the tumor would effect the cure of this disease in the same manner as it does that of circumscribed aneurism—especially where the tumor is increasing;" and adds that he is not aware that the operation has been tried.

About this time, Mr. Atkinson, of York, (England,) tied the brachial artery for a large and increasing aneurismal varix, and mortification of the limb ensued. (S. Cooper, *Surg. Dict.*, Lond., 1839, art. *Aneurism.*)

Scarpa (*On Aneurism*, Wishart's translation, Edin., 1808, p. 397) expresses the opinion that the surgeon should "not hesitate to perform the operation (of Anel) if the aneurism is still small and circumscribed."

Physick, shortly afterward, tied the femoral artery for an arterio-venous aneurism below the knee; the limb mortified, and the patient died from hemorrhage. (*Dorsey's Surgery*, Philad., 1813, vol. ii. p. 210.)

Liston, in recent cases, advocates the Hunterian operation, and, at the same time, acknowledges that he has found it unsuccessful in more than one instance. (*Prac. Surg.*, Lond., 1847, 4th ed.)

Miller says, "if the disease have existed long, and be of large size, etc., it may be treated on the Hunterian principle." (*Princ. Surg.*, 1st Am. ed., p. 342.)

Mott prefers the Hunterian operation, except in recent cases, and in the least serious form of aneurismal varix. (*Velpeau's Oper. Surg.*, Am. ed., vol. ii. pp. 292–3.)

Dupuytren decides that, "although reason would induce us to employ the operation of Anel in this disease, experience has demonstrated its inefficiency." (*Leçons Orales*, t. 3e, p. 145, 2e ed.)

Breschet (*sur les Anévrysmes, Mem. de l'Acad.*, t. 3e) reports two cases in which he employed the simple ligature of the artery without success; and also two cases with a similar result operated upon by Dupuytren, one of which terminated in gangrene. He expresses the following opinion: "La ligature du tronc artériel, d'après la méthode de J. Hunter, appliquée aux anévrysmes variqueux, est donc dangereuse, la plus souvent funeste, et le moindre de ses inconvéniens est d'être insuffisante."

Lisfranc, *de l'Oblitération des Artères, etc.*, Paris, 1834; Begin, *Nouv. Elém. de Chir.*, t. 2e, p. 75, 2e éd.; Boyer, *Mal. Chir.*, t. 2e, p. 192; Malgaigne, *Méd. Opér.*, Paris, 1837, p. 204; Guthrie, *Dis. of Arteries*, Lond., 1830, p. 334; John Burns, *Princ. of Surg.*, vol. i. p. 486; Syme, *Path. and Prac. Surg.*, Edin., 1848, p. 292; and Park, *Med. Facts and Obs.*, vol. iv. p. 111, give a decidedly unfavorable opinion with regard to the Hunterian operation. S. Cooper, *Surg. Dict., loc. citat.*, and Velpeau, *Med. Oper.*, Paris, 1839, t. 2e, p. 186, express themselves with much hesitation as to its propriety. A more recent writer, Rodrigues, *Obs., etc. sur l'anév. variqueux, Gaz. des Hôp.*, Jan. 1841, thinks that if accompanied by compression, applied to the

tumor, "the operation of Anel may hereafter become more successful."*

It is worthy of remark that neither Astley Cooper, *Surg. Lect.*, Phil., 1826, vol. ii. p. 37, nor Colles, *Surg. Lect.*, Phil., 1845, p. 197, had encountered a case of this disease which seemed to require operative interference.

Most of the authorities who oppose the application of the Hunterian principle to the cure of arterio-venous aneurism, base their objections to the operation upon its inefficiency; inasmuch as experience has shown that the disease almost invariably returns after its performance. The danger of gangrene is only alluded to incidentally. Breschet recognizes it, and attempts an explanation of the mode in which it occurs. S. Cooper (*ut supra*) adopts Breschet's rationale, and bases his unfavorable opinion of the operation upon it, and a case of Sir Charles Bell, which was followed by gangrene. The author of the article on aneurism, in the Cyclopædia of Surgery, asks the question why gangrene of the limb occurs more frequently after ligature of its main arterial trunk for this disease, than for the other varieties of aneurism; but he leaves it unanswered, and the question of the propriety of the operation, unsettled.

Breschet accounts for the occurrence of the gangrene in the following manner: He asserts (*loco citato*, pp. 209, 252) that he has seen in the living body, during an operation upon a case of arterio-venous

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* A case is recorded (London Lancet, Oct. 1834, p. 144) of varicose aneurism at the bend of the arm, in which the communication with the vein was obliterated by pressure, and, the disease being thus reduced to a simple circumscribed false aneurism, the brachial artery was tied successfully by Mr. Lloyd.

aneurism, the alternate exchange of contents carried on between the artery and vein through the unnatural opening, by means of which a portion of the venous blood is carried again to the limb by the artery, and an equal amount of arterial blood is returned unused to the heart, by the vein. The limb, thus habitually deprived of a portion of its arterial supply, loses proportionally its size, strength, temperature, and sensibility; and moreover, according to our author, its arteries below the seat of the disease invariably undergo alteration—becoming larger in their caliber, thinner in their walls, and much more tortuous in their course, thus resembling veins. Premising these facts, which are considered as demonstrated, if in this condition of the limb its main artery is tied between the disease and the heart, the arteries below the disease, from their changed condition, being unable to contract upon the diminished quantity of blood conveyed into them through the collateral channels, the circulation is not carried on, and the vitality of the limb, already lessened, is entirely annihilated.

Thus it appears that Breschet attributes the gangrene solely to the altered condition of the arteries of the limb below the seat of the disease.

Now, this change in the arteries, although it undoubtedly exists, as in the cases reported by Breschet, is not admitted by some authors to be of uniform occurrence,—in fact in the present case it was by no means well marked. It seems to me that, in addition to this explanation, there is another circumstance to be taken into account, which is not altogether without its importance. According to Breschet's evidence, when a communication exists between an artery and

a vein, a portion of the arterial current passes into the vein at each systole of the heart, and during its diastole a counter-current of venous blood overflows into the artery. Now, when the arterial current is arrested by a ligature, the systolic impulse conveyed through the devious collateral channels is barely perceptible, if it exist at all, by the time that the blood has reached the main trunk below the ligature, and therefore, the current through the vein not being interrupted, we may readily infer that it would overflow into the artery through the abnormal opening more freely than before, as it meets with no opposing current from the artery. Thus the arterial blood received by the limb through its anastomosing arteries, already perhaps deficient in quantity, and degenerated in character,* is still further depraved by constant and free admixture with the effete venous blood of the limb.

Hence I would infer that, in the present case, the circumstance of the abnormal communication was probably the principal cause of the gangrene. Prof. Horner suggests (*Am. Journ. Med. Sci.*, Jan. 1841) that the arterial blood brought into the limb under these circumstances finds its way back to the heart so much more readily through the unnatural opening, than by its ordinary route through the capillaries, that it is thus deprived of a sufficient arterial supply.

Thus far for the manner in which gangrene is

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* The dark color and continuous flow of the blood in hemorrhage from the distal extremity of a wounded artery demonstrate that it has already lost some of the qualities of arterial blood, and that it is certainly not as well able to support the vitality of a limb as that received directly from the heart.

brought about; it remains to be determined in what proportion of cases of arterio-venous aneurism, treated on the Hunterian principle, it occurs; and in what class of cases it is most to be dreaded. The only mode of settling this question is by investigating the records of surgical practice, and drawing conclusions from the results of actual experience. Dupuytren's conclusion with regard to the treatment of this disease, at the time it was made, was no doubt as correct as it is unsatisfactory: "La chirurgie est riche en méthodes, et en procédés opératoires, mais elle est pauvre en faits bien observés sur lesquels on puisse établir la pre-eminence ou l'infériorité de ces méthodes et ces procédés." May there not have been accumulated by this time sufficient evidence to justify us in advancing one step farther in our knowledge of this intricate subject?

The following cases, derived from sources within our reach, have been thrown together in a tabular form for the purposes of analysis.

TABLE OF CASES SHOWING THE RESULT OF THE HUNTERIAN OPERATION IN ARTERIO-VENOUS ANEURISM.

No.	SURGEON.	WHERE RECORDED.	SITUATION OF DISEASE.	DURATION OF DISEASE.	ARTERY TIED.	CONSEQUENCES OF OPERATION, AND REMARKS.	FINAL RESULT.	PERIOD OF DEATH.
1	Atkinson.	S. Cooper, Surg. Dict., art. Aneurism, p. 191.	Bend of arm.	.....	Brachial.	Gangrene of limb.		
2	Chas. Bell.	Idem.	Bend of arm.	.....	Brachial.	Gangrene of limb.	Death.	
3	Physick.	Dorsey's Surg., Philad., 1813, vol. ii. p. 210.	Below the knee.	.....	Femoral.	Gangrene of limb. Hemorrhage.	Death.	
4	Collier.	Med.-Chir. Trans, vol. vii., part 1st, p. 136.	Upper part of thigh.	2 months.	Ext. Iliac.	Gangrene of limb.	Death.	4th day.
5	Perry.	Idem, vol. xx.	Near the knee.	4 years.	Femoral.	Hemorrhage.	Death.	6th day.
6	Dupuytren.	Breschet, sur les Anevrysmes, Mem. de l'Acad. Roy. de Méd., t. iii. p. 223.	Upper part of arm.	2 years.	Brachial.	Disease reappeared in a few days.	Amp. of limb.	
7	Dupuytren.	Idem, p. 226.	Lower third of thigh.	6 months.	Femoral.	Gangrene of limb. Hemorrhage.	Death	28th day.
8	Breschet.	Idem, p. 212.	Bend of arm.	3 months.	Brachial.	Disease returned in a few days. Artery afterward tied above and below the disease.	Cure.	
9	Breschet.	Idem, p. 219.	Bend of arm.	8 days.	Brachial.	Same results.	Cure.	
10	.....	Cloquet, Pathol. Chirurg., p. 85.	Bend of arm.	.....	Brachial.	Disease returned. The limb became atrophied, the fingers livid, and the nails fell off.	Amp. of limb.	
11	Morrison.	Am Journ Med. Sci., vol. xxii. 1838	Groin.	11 years.	Ext. Iliac.	Gangrene of limb.	Death.	3d day.
12	.....	Hennen, Mil. Surgery, Edin., 1820, p. 183.	Groin.	A few weeks.	Ext. Iliac.	Gangrene of limb.	Death.	In a few days.
13	Baroni.	Archives Générales, 1840.	Upper part of thigh.	.....	Ext. Iliac.	Return of disease on 5th day; partial gangrene of limb; secondary hemorrhage; ligature of femoral.	Death.	54th day.
14	Lallemand.	Gaz. Méd., 1841.	Upper part of thigh.	5 years.	Femoral.	Hemorrhage. Ext. iliac afterward tied.	Death.	5th day.
15	Lawrence.	Ormerod, Clin. Surgery, London, 1846, p. 145.	Upper third of thigh.	13 weeks.	Com. Fem'ral.	Gangrene of limb; amputation.	Survived.	
16	.....	Lond. Med. Gaz., vol. xxvii. p. 143.	Bend of arm.	22 days.	Brachial.	Extensive swelling of limb; gastric symptoms; diarrhœa.	Death.	21st day.
17	Chelius.	Gaz. Médicale, 1843, p. 530.	Rt. temporal region.	14 months.	Rt. prim. Car.	Return of disease after 3d day.		
18	Mott.	.....	Upper third of thigh.	2½ years.	Ext. Iliac.	Gangrene of limb.	Death.	6th day.
19	Alquié.	Velpeau, Méd. Oper., t. ii. p. 486.	Bend of arm.	.....	Brachial.	Hemorrhage; artery tied a second time; hemorrhage returned repeatedly; finally compression effected a cure.	Cure.	
20	.....	Roux, Gaz. Méd., 1837, p. 347.	Bend of arm.	.....	Brachial.	.....	Cure.	
21	T. Harris.	Prof. Horner, Am Journ. Med. Sci., Jan. 1841, p. 74.	Upper part of thigh.	3 months.	Com. Fem'ral.	Gangrene of limb; return of disease.	Death.	31st day.
22	Baynham.	Am. Journ. Med. Sci., Oct. 1841, p. 480.	Middle of the thigh.	.....	Femoral.	Hemorrhage; disease returned	Survived.	

In addition to the cases included in the table, there are two others recorded, in which the result was unsuccessful: one by Portal, (*Chirurg.*, t. i. p. 203,) and another by Brown, (*Velpeau, Med. Oper.*, t. ii. p. 186.)

Thus we have 24 cases of arterio-venous aneurism treated by ligature of the artery between the disease and the heart, in which 23 were unsuccessful, and one only is said to have been cured. And this solitary case of cure is the only one included in the table whose authenticity is at all equivocal. It was that of a man exhibited to Roux as a surgical curiosity, at Milan, in Italy, during his visit to that country in 1836, and reported by him, on his return, to the Academie Roy. de Med. of Paris. Velpeau (*ut supra*) expresses a doubt as to whether the disease was in reality arterio-venous aneurism.

In the 22 cases, death followed, as a consequence of the operation, in 12; the result of one case is doubtful, and 9 survived. Of the survivors, one is the case of cure; three underwent amputation; and four were subsequently cured by other means.

In the 12 fatal cases, 6 died from gangrene; 2 from hemorrhage; in 3, both gangrene and hemorrhage contributed to the fatal result; and one perished from constitutional irritation.

In 9 of the 22 cases, the brachial artery was tied for the disease occurring in the upper extremity. Of these, one is the case of cure; two certainly died, and a third was probably fatal, (Mr. Atkinson's.) Of the remaining 5, two underwent amputation, and 3 were subsequently cured by other means, viz., two by ligature of the artery above and below the disease, and

the third by compression, after repeated hemorrhages. In the upper extremity gangrene occurred twice, and in a third instance (10) the condition of the limb approached so nearly to gangrene that amputation was performed. In the instance in which the common carotid was tied, the disease was ultimately cured by the operation of Kiesler.

In the 12 cases of the disease seated in the lower extremity, the external iliac artery was tied, primarily, five times, and gangrene followed in all. The common femoral was tied twice; gangrene followed in both. The femoral artery was tied five times; gangrene followed in two of these cases, and hemorrhage in all. In one instance (14) the external iliac was tied for hemorrhage following the ligature of the femoral, without preventing a fatal result. In fact, the only cases in which death did not follow the operation in the lower extremity are those of Baynham, whose patient survived after a very serious secondary hemorrhage, and Lawrence, who had recourse to amputation during the progress of the gangrene.

The hemorrhage in these cases is due, beyond a doubt, to the altered condition of the arteries consequent upon the disease, and this is a circumstance which has not received the degree of attention which its importance demands. It furnishes an additional argument against the Hunterian operation in this disease, and is calculated to interfere materially with the success of any operative process undertaken for its cure. It occurred in 7 out of the 22 cases included in the table; and in 5 it was more or less directly the cause of death.

In the sound and judicious remarks appended by Dr. Norris to the notice of Lallemand's case (14) in the *Am. Journ. Med. Sci.*, October, 1841, he asserts that "all reason and experience on the subject go to show that no good result can be expected from the application of a ligature above the tumor in this disease."

Are we not fully justified by the facts thus set forth, with regard to the ligature of the artery on the Hunterian principle in arterio-venous aneurism, in arriving at the conclusion that the operation not only promises no good result, but that its performance is absolutely unjustifiable?

In confirmation of this conclusion, I am happy to have it in my power to state that Prof. Mott, in view of the results shown above, admits its entire correctness, and has recently given an opinion adverse to that expressed by him in the American edition of Velpeau's Operative Surgery, already quoted.

MALIGNANT POLYPUS OF THE NOSE.*

MALIGNANT POLYPUS OF THE NOSE—LIGATURE OF THE COMMON CAROTID ARTERY—DEATH WITH CEREBRAL SYMPTOMS.

THE method of statistical investigation at present so greatly in vogue with those in pursuit of certainty in medicine has been accused of fallacy, because, in the cases of medical and surgical practice on record, those of successful issue are always found to bear a much larger proportion to those whose result has been unhappy than accords with the actual results of practice. In the present state of our knowledge, therefore, an unsuccessful result, fairly stated, is of more actual value to the compiler of statistics, in his search after truth, than a brilliant success; and personal considerations should never be allowed to interfere with the interests of our science. In this spirit the following case is placed on record.

M. W., a married woman, of moderately robust constitution, a native of England, thirty-four years of age, was admitted into Bellevue Hospital, November, 1848, with a very vascular encephaloid tumor filling the nasal cavities.

About eight years ago, while nursing her third child, she was attacked suddenly, and without any

* From the New York Journal of Medicine, vol. ii. p. 297.

known cause, with a very profuse and obstinate epistaxis, which continued for five days before it was arrested, causing so much exhaustion that the patient was confined to her bed for several days.

Some twelve months after this, having meanwhile enjoyed excellent health, she was taken with an unusually violent headache, which lasted for two days, when a hemorrhage again took place from the nose, which, although it was arrested in twenty-four hours, was much more profuse than on the former occasion. She fainted repeatedly during its continuance, and was confined to her bed for more than two months afterward, by weakness from the loss of blood. About a month after the last hemorrhage, the patient began to feel some uneasy sensations in the right nostril, which in two months more became constant and annoying, and at the end of a year a tumor had made its appearance in the nostril, which she was advised to have removed. A small pulpy mass was accordingly brought away by the wire and canula, and followed immediately by a most violent hemorrhage, which was only stopped by plugging the nostrils, after the loss, according to the statement of her surgeon, of more than three pounds of blood in five minutes. She was an invalid after this operation for more than six months, under medical care, during which time caustics, etc. were repeatedly applied to the tumor, which remained, however, very much in the same condition until she came to this country, some four years since. From this time it gradually increased in size, encroaching on the nostril of the opposite side, and causing absorption of the neighboring bones. Two years ago, a soft, fluctuating, conical swelling

made its appearance over the *os nasi* of the right side —evidently a growth from the tumor within, the bone being absorbed by its pressure.

November 21st. Tumor has increased in size more rapidly of late, causing much pain over the right eye, uneasiness in the right side of the head, and ringing in the right ear. Patient's general health moderately good, although declining from the constant distress and consequent sleeplessness. She has not been in the habit of using opiates.

22d. Consultation on the propriety of ligature of right carotid artery. Agreed that it should be done as soon as possible, as the only means of palliating the progress of the disease. There is to-day considerable erythema around the external tumor at the base of the nose, with œdema of eyelids on both sides, excitement of the circulation, and increased pain of the head. No sleep last night. Patient is anxious to have anything done that promises even temporary relief. ℞. ol. ric. ℥i—to be followed after its operation by a full opiate. Cold lotion of lead and opium, and mustard pediluvium.

23d. More comfortable in every respect. An eschar, the size of a sixpence, has formed on the summit of the external tumor. Had some sleep. Ordered Seidlitz powder and light animal food. The tumor can be felt projecting backward, through the posterior nares, by the finger in the fauces, and can be seen anteriorly filling the cavity of the nose, and projecting slightly from the right nostril. Pressure upon the right primitive carotid causes visible diminution in the bulk of the tumor, and stops the painful throbbing which the patient always feels in it.

24th. Comparatively comfortable, although she has slept none; has been talking rather wildly at times during the night. No fever, and the œdema and redness have disappeared from face. The eschar on the external tumor has fallen, and a bright and vascular fungus is protruding through the opening. There is a constant and free watery discharge, both from the nostril and the external fungus.

Half-past one P.M. Ligature applied to the right primitive carotid, with immediate relief to the tensive throbbing pain of the tumor and that over the right eye. This was replaced by a new and peculiar pain in the right side of the head, which caused some complaint, accompanied by a marked pallor of face. The tumor shrank palpably in volume. Patient was put to bed moderately comfortable, and in good spirits, with directions that she should have light nourishment, and an anodyne toward evening, if the pain should increase.

25th. Patient had a full dose of morphine before midnight, and slept several hours. Toward morning had a slight chill.

Two P.M. Pulse 120, full and tense. Much pain complained of in back of head, right shoulder, and left side below the short ribs. Soreness of throat. V. S. ad ℥xij with relief to pains. Took a full anodyne at four o'clock P.M. During the night complained of considerable pain, and talked wildly at times.

26th. Ten A.M. Patient has been partially insensible since five o'clock this morning. She can be aroused, but is unable to articulate, or to swallow fluids except with extreme difficulty. Pulse 100 to

110, and varying slightly in force as well as in frequency. Pupils contracted — equally; sensible to light. Skin cool; moist. Breathing regular, and slightly convulsive. Slight duskiness of surface. Sinapisms to legs; blisters to thighs. There is, apparently, partial hemiplegia of the left side.

27th. Same condition; hemiplegia undoubted, although incomplete. Pulse 110 to 130; varying in frequency and force. Has passed urine voluntarily. Bowels have not moved. She has been partially aroused several times, but on the whole is evidently sinking. Blister between scapulæ; a mixture of croton oil and olive oil to be applied to the mouth occasionally with a feather.

She continued sinking, and died at midnight, eighty-two hours after the ligature of the artery.

Post-mortem examination twelve hours after death. Appearance of body slightly changed; contraction of right side of chest. Tumor shrunken very considerably since death; it is now about one-third of its original size. Brain first examined. Membranes healthy. Amount of serum in arachnoid cavity and ventricles normal. Appearance of blood-vessels at base of brain natural. On section of its substance, the outlines of the cineritious matter of right hemisphere were evidently less distinct and well marked than of the left, and its color lighter. This was particularly noticed in the *corpora striata*. In the *corpus striatum* of the right side, and anterior to it, the cerebral substance is very considerably softer than in corresponding portions of the left hemisphere. No other evidences of disease were detected within the cranium. In the thorax numerous old and strong pleuritic adhesions

were found on right side. The lungs showed decided hypostatic congestion, and contained a number of *obsolete* (*cretaceous*) *tubercles;* otherwise healthy. Heart slightly hypertrophied. Liver healthy. Gall-bladder distended, and containing a number of biliary concretions.

Uterus presented several hard, shot-like tumors, containing fluid, situated around the inner edge of the os. These appear to be enlarged *glandulæ Nabothi,* and present the appearance described by Montgomery, as indicating the first stage of uterine cancer.

The tumor, which was removed entire, appears to have originated beneath the mucous membrane covering the right inferior turbinated bone, the substance of which had entirely disappeared. From this point it extended into the antrum of the same side, upward into the ethmoid cells, pushing the septum narium in contact with the turbinated bones of the opposite side, where the healthy mucous membrane had contracted firm adhesions, protruding into the pharynx posteriorly, and through the *ossa nasi* and integuments of the face anteriorly, everywhere causing absorption of the bones which opposed its progress.

The substance of the tumor, examined beneath the microscope, appeared to consist almost entirely of elongated, spindle-shaped, or caudate corpuscles, containing one or more nuclei.

The parts in the vicinity of the point at which the ligature was applied to the artery were carefully dissected. Everything here presented a healthy and favorable appearance; the wound was in a great measure consolidated by the effused fibrin in which

the ligature was imbedded; the nervous trunks (the *descendens noni* and *par vagum*) were free from any morbid appearance. A clot occupied the artery, from the bifurcation of the innominata to the point of ligature, which was evidently adherent to its lining membrane; above the ligature another clot, plainly of more recent formation, extended to the bifurcation of the artery, and two or three lines into the internal carotid.

The above case presents an interesting example of a disease of rather unfrequent occurrence. Cancer of the nasal cavities, generally known as "malignant polypus," is liable to assume all the varieties which characterize the cancerous deposit in other parts of the body, although the encephaloid form of the disease occurs by far the most frequently in this situation. The encephaloid deposit varies greatly, both in its degree of vascularity and in the rapidity of its growth. In the present instance the progress of the malady was unusually slow, while the vascularity of the tumor was excessive—profuse hemorrhages preceding apparently the development of the disease, and accompanying its growth, unprovoked by any interference. This latter circumstance seemed to warrant the hope that diminishing its supply of blood would impede the growth of the tumor. The characteristic appearance of the fungus which protruded through the integuments of the face a few days before the operation, together with the microscopic structure of the tumor, and the coexistence of incipient cancer of the uterus, render the nature of the disease unquestionable; while the presence of obsolete tubercles in the lungs furnish further evidence against the antago-

nism of tubercle and cancer, asserted by some pathologists.

The effect produced by the ligature of the primitive carotid upon the brain, which was evidently the immediate cause of death, furnishes another fact of interest in connection with the pathology of this organ, and illustrates one of the dangers of the operation, which is perhaps too often overlooked.

FIBROUS TUMOR OF THE LEFT OVARIUM.*

FIBROUS TUMOR OF THE LEFT OVARIUM SUCCESSFULLY REMOVED BY THE LARGE ABDOMINAL SECTION.

About the middle of October, 1849, I was visited by a respectable young woman and her mother, the latter of whom gave the following account of her daughter's complaints: In the first place, she said that her daughter had never menstruated, but had not experienced any marked inconvenience from the absence of the usual monthly discharge. She was now twenty-one years of age. Five years ago she first perceived a small, hard, movable lump in the lower part of the belly, on the left side, which slowly increased in size, approaching meanwhile the median line, and causing an appearance externally of gradual enlargement of the abdomen. In three years it had increased to its present size, and since then, she is of opinion it has not materially enlarged. About this period, however, owing apparently to the pressure applied to the abdomen by her mode of dressing—with the view of concealing its unsightly prominence—she began to be troubled by a protrusion from the genitals, which was now a source of excessive annoyance; so that with the mortification caused by the

* From the New York Journal of Medicine, vol. iv., (new series,) p. 159.

abdominal enlargement, and the annoyance of the protrusion, which interfered with her walking, she was determined to submit to any means that promised relief. She was a young woman of fine appearance, and a recent opportunity which had offered, of changing her mode of life, contributed also to induce her to seek for aid.

Her general health had always been excellent, and her family rather remarkable for vigor of constitution, to which she was apparently no exception.

On examination, I found the abdominal cavity occupied by a large, uniformly hard, spherical tumor, about the size of the head of an adult. It occupied the center of the belly, and was exceedingly movable. In fact, it could be turned almost entirely over on its own axis, in attempting to roll it from one side of the abdomen to the other. The hands could be readily passed under the tumor, on every side, when the patient was lying on her back, and it could thus be lifted, as it were, from its bed. It lay, ordinarily, in contact with the symphysis pubis, but the fingers could be insinuated beneath it on this aspect, without difficulty, and it could be forced upward at least four inches from the pubes. Between the thighs lay the inverted vagina, and the uterus, in a state of complete *procidentia*, forming a tumor which protruded more than four inches from the vulva. At the most dependent point of this tumor was, of course, the os uteri, into which I introduced a female catheter, which penetrated, to my surprise, to the distance of five and three-quarter inches before it came in contact with the fundus of the organ. This singular circumstance, which I subsequently verified on several occasions, I

attribute either to elongation of the cervix and body of the uterus, resulting from its having been forced through the narrow *osteum vaginæ* of a virgin by the superincumbent weight of the tumor, or inasmuch as the patient has never menstruated, the uterus may be congenitally malformed.*

The tumor, moreover, presented neither the ordinary shape nor feel of a uterus in a state of procidentia; it communicated to the fingers the idea of a long fibrous cylinder, about an inch in diameter. The *os* was perfectly healthy and natural in appearance, and contained some of the transparent and glutinous secretion of the follicles of the cavity of the cervix.†

On grasping the uterus, as it lay between the thighs, firmly with one hand, while with the other the abdominal tumor was pushed as far as possible upward toward the diaphragm, no impulse could be recognized as communicated by one hand to the other; and at the time when the greatest amount of force was applied, the two hands were fully eight inches distant from each other, thus affording fair demonstration that the attachments of the tumor to the uterus were susceptible of considerable elongation, which circumstance, taken in connection with the extreme mobility of the tumor, rendered it almost certain that the pedicle by which it was attached to the

* Such a malformation, *i.e.* an unnaturally elongated uterus, is occasionally met with; in fact, I have seen an instance within the year, in a young woman who died at Bellevue Hospital, of organic disease of the kidneys, under the care of my friend, Dr. B. W. McCready.

† The whole tumor could be readily reduced into the cavity of the pelvis, where it would remain as long as the patient preserved the horizontal position, but as soon as she rose to her feet, it would come down again.

uterine apparatus was both long and slender. When the uterus was restored to its normal position, the lower edge of the tumor was distinctly felt from the vagina, and its probable connection with the left ovary recognized. This was confirmed by the origin of the tumor in the left iliac region, and by the result of a rectal examination in the upright position, by which means a knobbed projection from the tumor was distinguished, which was supposed to be the left ovary.

After this somewhat thorough examination, I informed my patient and her mother of the nature of the protrusion from the genitals; that it depended upon the weight and growth of the tumor of the abdomen, and could not be remedied with any certainty while the tumor remained in the belly; that there were no medical means capable of removing the tumor, but that such tumors had been removed by a surgical operation, which, however, was attended with imminent danger to life. She immediately testified her willingness to incur any risk which was accompanied by a prospect of relief. I then explained to both parties, as clearly as I was able, the probable course of the disease, and the amount of risk to life involved in the operation, and requested them to consider the subject maturely, and to inform me at the end of a week of their conclusion; meantime, at my request, the patient was examined by my father-in-law, Professor Mott, and by my excellent friends, Prof. Parker, Drs. J. P. Batchelder, Metcalfe, Markoe, and V. Mott, Jr., who all concurred in the opinion that, owing to the extreme mobility of the tumor, and its apparently slender connection with the uterus or its appendages, the case was a peculiarly favorable

one for operative interference, if such interference were in any case justifiable.

The evident absence of any extensive connection of this solitary tumor with any of the abdominal viscera, its apparently purely fibrous character, and the absence of all suspicion of anything carcinomatous in its nature, together with the excellent constitution, and quiet, determined character exhibited by my patient, induced me to think very favorably of acceding to her request, and of submitting her to an operation. Her opinion that the tumor had not increased in size since the appearance of the *procidenta uteri*, I satisfied myself was fallacious. The efforts she employed to compress her abdomen within moderate dimensions, had evidently forced the tumor more into the cavity of the pelvis, and in so doing had extruded its natural contents, while the enlargement of the abdomen was apparently arrested. From the gradual increase in the size of her dresses, it was only too evident that the disease was steadily growing. Having satisfied myself thoroughly on this point, I concluded that, if she adhered to her resolution to submit to an operation, after the full and fair statement that I made to her of the risk incurred, I would undertake the removal of the tumor; and accordingly, when at the expiration of the week she returned and announced her determination to undergo the operation, I requested her to confine herself to a diet of bread and water for a week, and promised at the end of that time to do what I could for her relief.

On Monday, Oct. 29th, she took a full dose of Ol. Ricini, which was repeated on the following Wednesday; on both of these days at the hour of my visits

(one P.M.) her pulse beat 76 in the minute, even after I had informed her, on the second visit, that I would perform the operation at the same hour on the following day.

On Thursday, Nov. 1st, at one o'clock P.M., I proceeded to the operation in the presence of the gentlemen named above, with the addition of Dr. Welford, of Virginia; Prof. J. F. May, of Washington; Drs. Isaacs, Fleet, and Kingsbury, and my pupils, Messrs. Page, Cunningham, Doneghy, Wilson, Turnbull, Vollum, and Hanners; and with the especial assistance of Dr. James R. Wood, and Messrs. Page, Cunningham, and Hanners.

My friend, Dr. John T. Metcalfe, for whose advice and assistance I am also much indebted in the after-treatment of the case, administered the chloroform with his usual skill and success. The patient, who had not been allowed to eat any food for five hours previously, was rendered insensible in an adjoining apartment, and immediately before commencing the inhalation, she was requested to empty her bladder as perfectly as possible, and Dr. Metcalfe noticed that her pulse at this time, as before, was 76. It was about 65 when she was placed upon the table, nor did it vary materially from this rate, or in quality, during the hour and fifteen minutes that she was kept under the full influence of the anæsthetic; for she was not allowed to suffer the slightest pain until she was again replaced in bed, after the completion of the operation, the dressings, and the changing of her clothing.

After carefully replacing the uterus and vagina in their natural position, I made an incision on the *linea*

alba ten inches in length, and cut carefully down to the peritoneum, tying or twisting all the vessels that gave blood, in order that as little as possible should escape into its cavity. This incision, after opening the peritoneum, and slitting it upward and downward with a probe-pointed bistoury to the full extent of the external wound, I was obliged to prolong fully two inches, before the tumor, with some effort, could be forced through it. At this moment we recognized with regret that the omentum was adherent to the superior surface of the tumor, over a space as large as the open hand. This was quickly detached, the scalpel being carried as closely as possible to the periphery of the tumor; three vessels of the omentum required ligatures, of which both ends were cut off close to the knot, and the remaining portions returned to take their chance in the cavity of the peritoneum. The omentum detached, we turned to the pedicle of the tumor, and found to our gratification that it was slender, as was anticipated, consisting in fact of the left broad ligament of the uterus, singularly elongated and attenuated. This I proceeded to detach from the tumor, still cutting close to its surface, and tying five arteries of considerable size as they were divided. The cut surface on the tumor left by the division of this solitary attachment to the uterus measured a half inch by two and a half inches. The tumor being thus removed, its pedicle, some six inches in length, with five ligatures attached near to its fimbriated extremity, and containing, palpably, the fallopian tube in its substance, was left protruding through the wound. This it was proposed to include, at its middle, in a solitary ligature, removing the dis-

tal portion, and dividing carefully the peritoneum on the uterine side of the ligature, in order to avoid strangulation,—thus substituting one ligature for five. This was accordingly done, and the fimbriated extremity of the fallopian tube, together with the point of attachment of the tumor to the broad ligament, was cut away. In the portion remaining there was no trace of an ovary. We took the liberty of examining into the condition of the right ovary, and the fundus of the uterus, both of which felt and looked as they should, nor was there any further trace of morbid growth to be discovered.

After this rapid exploration, which was all that was deemed justifiable, we proceeded to replace the omentum and to close the wound. This was effected by the introduction of seven full-sized "Carlsbad insect pins" at equal intervals, around which were applied strands of soft coarse darning cotton, as recommended by Dieffenbach. Strips of adhesive plaster were accurately applied in the intervals, and the solitary ligature from the peritoneal cavity was brought out at the lower angle of the wound. A little scraped lint along the incision, a longitudinal compress, and a carefully applied bandage around the abdomen completed the dressing. After changing some portions of her dress, our patient was carried to her bedroom, and was left, with but one attendant near her, in perfect quiet, until consciousness should return. At this time her pulse was 75 in the minute, and natural in quality.

During the operation, and while we were separating the omentum from the tumor, some mouthfuls of greenish watery fluid were ejected by the stomach, and a slight effort at vomiting was noticed once or twice

afterward at intervals. With this trifling exception, the patient was perfectly quiet throughout, and the influence of the chloroform was everything that could be desired. The peristaltic action of the intestines, usually so troublesome to the assistants in operations of this sort, was in our patient not observable; the bowels during the time of their exposure were as quiet and passive as those of a *cadaver*. The action of the abdominal muscles was hardly noticeable, even during the effort at vomiting.

When the peritoneum was first opened, there was a slight gush of serous fluid, of which there seemed to be about ℥xx in its cavity. The amount of blood that escaped into the cavity of the peritoneum did not probably exceed ʒij, and this was principally from the veins of the tumor, while being separated from its connections. The quantity was so slight that I did not think it worth while to use the sponge for its removal.

After the attachments of the omentum to the tumor had been divided, it was noticed by Dr. Wood that there was a double twist in its pedicle, and it was necessary to turn it over, completely, twice, before the broad ligament was recognized in its proper aspect. This twisting of the pedicle was no doubt owing to the fact that the tumor had been made to revolve on its axis more than once, at some former period, before the omentum had contracted adhesions to it; and these omental adhesions were probably the only obstacle that prevented me from turning the tumor completely over on my first examination of the patient.

Another circumstance remarked during the opera-

tion, was the greatly increased thickness of the peritoneum lining the abdominal walls; this, together with the omental adhesions, and the serum in its cavity—all products of inflammation—would seem to be attributable to the irritation caused by the size of the tumor, and to the somewhat rude attempts of the patient to diminish it by pressure.

On turning our attention to the tumor, which the comfortable condition of our patient allowed us to do as soon as she was removed from the room, it was found to weigh, as nearly as possible, seven pounds avoirdupois, and to measure twenty-three inches in circumference. On its surface were two irregularly-shaped commencing cysts, each about the capacity of fʒij, containing ordinary serum. At the point where the pedicle was attached was the knobbed projection, the size of half a billiard ball, which had been felt from the rectum. On laying the tumor fairly open, its structure was, to all appearance, purely fibrous, and that of the knobbed projection was similar in all respects to the rest of the tumor. Its substance was uniformly very dense, permeated by some large venous sinuses, and apparently well supplied with blood-vessels, some of which, retaining their contents, made vascular patches on the cut surface; otherwise its color in the interior was of a dead white. Here and there on the cut surface a minute sac, or vesicle, the size of a very small pea, was to be seen laid open by the knife.

I may state here that the structure of the tumor has been since examined microscopically by my kind friend, Professor A. Clark, of the College of Physicians and Surgeons, of this city, to whose pathological skill,

in common with many of his professional brethren, I have been not unfrequently indebted; and that his examination reduces its purely fibrous character to a demonstration. It consists of fibers, interlacing each other in every possible direction, with minute and uniformly angular interspaces, and of no other histological element whatever. Not a cell was discovered in its structure; and this circumstance, as well as its mode of growth, forbid the idea of anything cancerous in its nature, or of its probable reproduction. I may also state that the structure of the tumor, with the numerous minute cysts scattered throughout its substance, its position and attachments, and the source of the vessels supplying it with blood, together with the fact that there is no other ovary on the left side, render it extremely probable that the tumor is nothing more nor less than the left ovarium in a state of fibrous overgrowth, or degeneration; and, judging from the commencing cysts on its surface, that it would have developed itself sooner or later in the form of a classical ovarian dropsy.

To return to our patient. Within ten minutes after she was placed in bed, she began to complain of burning pain in the abdomen, and of chilliness. I found her surface cool and dry, with a pulse increasing in frequency, and administered at once ¾ gr. of reliable sulphate of morphia in solution, with bottles of hot water to the feet.

At half-past three o'clock P.M., her consciousness having perfectly returned, I informed her that the operation had been completed, at which she evinced considerable surprise and satisfaction; and that thus far she was perfectly safe, cautioning her to keep her-

self as quiet and composed as possible, and to endeavor to sleep.

I then left her in charge of Mr. Page, with directions to repeat ¼ gr. of morphia, if she still complained of pain at the end of two hours.

At six o'clock P.M. she got ¼ gr. morphia.

Half-past seven o'clock P.M. Still complains of slight general uneasiness, and of pain in the back. Pulse 108, full and soft. Skin pleasantly warm. Pupils rather large. Disposed to sleep. To have cold water in small quantities, and cracked ice during the night.

Friday, Nov. 2d, half-past nine A.M. Patient has been quiet and free from pain during the whole night. She slept quietly and uninterruptedly from eleven o'clock till two o'clock this morning, and also at shorter intervals, asking occasionally for water. At seven o'clock A.M. she passed about f℥xij of dark-colored urine, without pain. At eight o'clock she complained of nausea, and ½ gr. of morphia was given in solution, according to direction, which was vomited in fifteen minutes. Complains now of a sense of general oppression, and occasional difficulty in breathing. Attitude and pupils natural. Skin moist and pleasant. Pulse 102, very slightly tense.

To take toast-water and ice, and repeat morphia on any increase of pain.

Seven o'clock P.M. No pain of consequence; disposed to sleep. Thirst considerable. Surface hot, with occasional moisture. Pulse 115, soft. Pupils natural. No change in treatment. Repeat morphia if pain or uneasiness increase.

Saturday, 3d, half-past nine o'clock A.M. Was restless after evening visit, and took gr. j morphia at

half-past twelve o'clock. This morning is heavy and drowsy. Pupils smaller. Tongue dry and furred. Pulse 112, and less full. Skin warm and moist. No pain or restlessness. Continue toast-water and ice, and add very thin arrow-root as a drink occasionally.

Eight o'clock P.M. Dr. Metcalfe present. Patient has been fretting at the delay of our visit, and is alarmed at some swelling of the abdomen, which is evidently caused by wind in the bowels. The influence of the morphia has begun to subside. Her attitude and aspect are natural. Pulse 112, soft. Respiration 17. Skin moist. Her mind was quieted; gr. j of morphia administered, and tepid catnip tea ordered for drink during the night.

Sunday, 4th, ten o'clock A.M. Has been somewhat restless and thirsty during the night, but free from pain. Passed wind freely *per anum*. Passes water freely and frequently. Pulse 112, soft. Respiration 16, (asleep.) Skin moist. Drowsy.

No change in treatment.

Thus far her decubitus has always been natural, and there has been no pain on pressure of abdomen.

Twelve o'clock M. There is now more restlessness and anxiety than she has yet shown. Attitude natural. Slight pain on pressure of belly, with occasional shooting pains. Her pulse is 120. Skin hot. Morphiæ sulph. gr. j in solution.

Six o'clock P.M. She is easy and comfortable; complains of no pain whatever, even on pressure of abdomen. Less thirst. Skin moist. Pulse 106, soft. Respiration 16, sighing. Pupil small. Not particularly drowsy. Continue catnip tea and arrow-root.

Monday, 5th, ten o'clock A.M. Still comfortable;

complains only of weakness. Pulse 110, softer. Skin more moist. Respiration 16, sighing. Bowels somewhat distended with wind. Barley-water, with lemon; strong aniseed tea for drinks; arrow-root.

Eight o'clock P.M. Took gr. j morphia at twelve o'clock M. Complains of a feeling of weakness and oppression. Pulse 108, quite soft. Respiration 6, sighing. Pupils smaller than natural. No swelling of belly. Urine passed naturally. Tongue white, furred, and moist. Barley-water during the night.

Tuesday, 6th, half-past nine o'clock A.M. Has had a good night, and is quite cross and fretful this morning. Complains only of weakness, and of the irksomeness of confinement. Pulse 106. Skin moist. Respiration 14. Thick white fur on tongue. Removed bandage and compress from abdomen, and withdrew two of the pins. Union is complete, except where the ligatures pass out. At one of these points a small quantity of fetid pus had collected between the integuments. Some wind in bowels. ℞. Magnes. Sulph. ʒj; Sp. Ætheris. Nit. ʒss; Ac. Sulph. Arom. ʒij; Aquæ Menthæ, ʒiijss; Syr. Zingiberis, ʒij. M. Take a tablespoonful every hour. Barley-water with raisins and strong aniseed-water for drink. Arrow-root and milk for diet.

Wednesday, 7th, ten o'clock A.M. No complaint except of wind and griping in bowels. Aphthæ on tongue and mucous membrane of mouth. Tongue is red and sore. Pulse 96. Skin natural. Removed another pin. Continue medicine, and chicken-water in addition to other food.

Seven o'clock P.M. Still complaining of wind and pain of bowels. No motion as yet. Otherwise doing

well. Administered very gradually a large enema of strong catnip tea and salt, which brought away three or four copious liquid motions, with much relief. Continue diet. No medicine.

Thursday, 8th, ten o'clock A.M. Has had an easy and comfortable night, and is doing well in every respect. Dr. Metcalfe has seen our patient with me daily since the third day. To-day we removed the dressings and the remaining pins. The union is complete, except where the ligatures pass out. Pins replaced by long strips of adhesive plaster.

Continue chicken-water and arrow-root.

From this date our patient continued to improve regularly and steadily without a bad symptom. The smaller ligatures came away early, and on the nineteenth day the large ligature from the broad ligament separated on slight traction. The aphthous inflammation of the mouth yielded after a few applications of the Mel Boracis.

A binder, carefully applied to the abdomen, was continued until the 1st December, when a laced bandage, which had been accurately fitted to the part, was substituted for it, and she was allowed to get out of bed, and gradually to assume her usual habits.

My attention at this time was anxiously directed to the uterus, for it was yet to be ascertained whether its recently formed adhesions would retain this organ in its normal position in the pelvis, or whether it would again descend, as she resumed the erect position, and to what extent. I examined her daily, *per vaginam*, and satisfied myself in a few days that artificial means would be soon required to prevent it from changing its position. At first the uterus maintained

its normal position perfectly, but shortly the os began to approximate to the vulva, and at the same time she complained much of uneasy sensations and dragging pains in the pelvis, and experienced a strong disposition to bend the body forward in walking. The mucous lining of the vagina was also somewhat prolapsed around the vulva, in consequence of the previous elongation of its connections. Accordingly I selected, and on the 10th of December applied, a spherical caoutchouc pessary, two and a half inches in diameter, which seemed to me to be the instrument best adapted to the case. I am pleased to find that since this instrument was placed in the vagina, she has ceased to suffer pain, and walks perfectly erect, and with a feeling of confidence unknown to her for some time before.

I have seen our patient within a few days, and am happy to state that, with the exception of the necessity of wearing the pessary, which I apprehend will continue but for a limited time, and which at the present causes not the slightest inconvenience, she is in the enjoyment of perfect health, and expresses in very strong terms her gratification at the improvement in her condition.

In connection with the foregoing case, of which I have endeavored to give an accurate and truthful record, without entering into unnecessarily minute details, I am desirous of noticing one or two points in its treatment, which seem to me to possess especial interest.

It will have been observed, no doubt, that opiates were employed with unusual freedom after the operation, and until all danger of inflammation had passed,

and this mode of treatment was carried out under the conviction, which I have long possessed, that in almost all forms of abdominal inflammation, opium is our most reliable remedy. This point in therapeutics, which I believe was first insisted upon by Gooch, I have frequently tested to its fullest extent, with the most satisfactory results. It was in fact the confidence I felt in the power of opium to prevent inflammation of the peritoneum, and in the influence of chloroform to avert the danger of shock to the system, that induced me to undertake the performance of an operation of which I hold no very high opinion, and which, even in so inviting a case, I should have hesitated to do without the sanction of my surgical friends.

There is, I conceive, a very close analogy between the influence exerted by opium and chloroform in averting the injurious effects of violence inflicted upon the organism,—as for example, by a severe surgical operation. I have witnessed the abdominal viscera of a delicate female exposed to the air, by an incision sixteen inches in length, for more than half an hour, handled, sponged, and bathed in the contents of ruptured ovarian cysts, while the pulse beneath my finger (as in the case which I have just recorded) did not vary from 75 beats in the minute, and characterized by all the rhythm, regularity, and volume of health; and this not succeeded by any collapse on the return of consciousness. It would be hard to believe that a state of things similar to this could exist, unless there were some protective agency extended to the nervous centers, rendering them unconscious, as it were, of the amount of injury being sustained by the system. Unless I deceive myself, I have witnessed this same

effect from the chloroform, in a very considerable number of instances.

When chloroform is only partially administered, as is frequently done through fear of its full influence, its good effects in averting the shock of injury are not experienced to the same degree: painful excitement, restlessness, and discomfort to the patient and operator, together with an unpleasant idea of the effects of the remedy to the lookers-on, are frequently the only results.

With regard to the use of opium as an antiphlogistic remedy, the same is true: inefficient doses excite the nervous centers, increase the discomfort of the patient, and fail entirely in their object. When the remedy, on the contrary, is administered freely but always intelligently,—the state of the pupils, the respiration, and, above all, its influence in keeping down pain, being closely watched,—I believe that it possesses the power of preventing the development of inflammation, as fully as chloroform will prevent the shock of an operation.

In accordance, then, with these views, I attempted the treatment of this case. The influence of the chloroform in preventing shock from the operation was certainly all that could be desired, and my guide afterward in the administration of the morphia was simply the existence of pain. Enough was exhibited to keep down all expression of abdominal pain, without regard to quantity. The influence of the full dose given on Sunday, (4th December,) the fourth day, at one o'clock P.M., was particularly striking. This was evidently, as will be seen by referring to the record, the critical period of the case; and a highly

respected friend who saw the patient at twelve o'clock M., an hour before, did not hesitate to inform me that things began to look seriously, and that the lancet might be required. There was restlessness, hot skin, pulse of 120, and lancinating pains in the abdomen. At no other visit were there so many unpleasant symptoms present in the case. A grain of morphia was administered at one o'clock, and at the evening visit, when the patient's condition I felt would decide her fate, I approached her bedside with no little anxiety. She had no pain; a soft, moist skin; a pulse of 106; small pupils, and her respiration was sighing, and 16 in the minute. I recognized in these symptoms that the danger was past, and that she was under the full influence of opium. From this time she did well, and in a few days the opium was discontinued. It seems to me, then, difficult to resist the conclusion that the opium, as well as the chloroform, had a large share in bringing about the favorable termination of the case.

With regard to the statistics of the operation of ovariotomy in our own country, I have knowledge of thirty-six operations performed up to the present time, of which the issue of fourteen has been fatal. Of these, five have been done in this city; three of them, which have never been recorded, terminated fatally from peritonitis; the remainder were perfectly successful, viz., that of Dr. D. L. Rogers, and the case now recorded.

DISEASES OF THE RECTUM.*

ON CERTAIN POINTS IN THE SURGICAL TREATMENT OF DISEASES OF THE RECTUM.

My motive in asking the attention of the Academy to *certain points in the surgical treatment of diseases of the rectum* is to elicit the experience of its members, and to determine the actual value of certain remedial measures I have employed for some time past, which seem to me to possess a decided advantage over the modes of treatment in general use. I have nothing original to propose, and shall simply give my own experience in carrying out the ideas of others, which have not received the degree of attention which they appear to me to deserve; hoping thereby to contribute to the more ready relief of some of the most common and painful diseases encountered in the practice of our art.

My first point involves the consideration of the best mode of exploring the rectum by the aid of the speculum. Before the employment of anæsthetics, even with the variety of specula devised for the purpose, this procedure was, in my experience, unsatisfactory. The power of rendering a patient uncon-

* From the Bulletin of the New York Academy of Medicine, vol. ii. p. 180. Read December 16th, 1863.

scious has proved of immense assistance; but, in order to effect the object thoroughly, it is necessary, after the full influence of the anæsthetic has been produced, to place the patient in a particular position, as well as to secure the best possible light. The position which I have found most advantageous is that employed by our colleague, Dr. Marion Sims, in his very successful operations upon the vagina and neck of the uterus, the superiority of which he first recognized and pointed out, as detailed in his paper on "Silver Sutures."

The patient is placed with the upper part of the trunk in a prone position, the front of the thorax in contact with the bed or table, the head on its left side, the left arm brought out at the left side and carried behind the back, the pelvis on its left side, with the thighs flexed at a right angle, and the buttocks exposed toward the light and elevated sufficiently to permit the abdominal viscera to gravitate toward the diaphragm. These details may seem unnecessarily minute, but those who have witnessed the operations of Dr. Sims will bear witness that they are easily carried out in practice, and that the position secures great advantages to the operator by permitting the air to enter and freely expand the vagina, thus relieved from the pressure of superincumbent organs. In exploration of the rectum, the same advantages are obtained as soon as the *sphincter ani* is dilated by the introduction of the speculum. The speculum I employ is a modification of that used for the vagina by Dr. Sims; the modifications consisting in the notch at its angle intended to receive the sphincter muscle, and thus to resist the tendency of

the instrument to slip out when the muscle is put upon the stretch, and the alteration of the handle, which is so shaped as to clear the buttock when it is swept around, so as to bring all sides of the cavity of the gut into view. To facilitate still further this latter manœuvre, and to protect the stretched mucous membrane from abrasion, the edges of the blade are carefully rounded and turned inward.

The speculum being introduced and the sphincter put upon the stretch with one hand, the other hand is used to draw away the parts on the opposite side of the orifice; and, the handle of the instrument being then gradually swept around, the light falls successively upon all sides of the exposed and expanded cavity. By the use of this manipulation applied to a patient in the position just described, I have frequently obtained a satisfactory view of the whole extent of the cavity of the rectum as high as its upper curve.

The next point to which I would ask your attention is the treatment of *fissure*, or, as the disease is more properly named, *irritable ulcer of the rectum*.

Fissure of the anus, or laceration of the mucous membrane of the rectum just within the anal orifice, is, I suspect, an accident of frequent occurrence, and it is almost invariably produced at stool by the effort of straining to extrude a mass of hardened feces. Most simple fissures thus produced probably heal at once, and give rise to no subsequent trouble; but when the subject of the accident is in a disordered condition of system, or when the costiveness persists, and the passage of hardened stools is of constant recurrence, the fissure is prevented from healing, and

is transformed into an unhealthy and irritable ulcer, which soon becomes the seat of severe and stinging pain of a peculiar character, and singularly disproportioned in amount to the trifling extent of the lesion. This disease is well described by Curling, Quain, Ashton, and other writers on diseases of the rectum. The ulcer is generally, although not invariably, situated on the posterior wall of the gut, and it takes an oblong shape from that of the fissure in which it has its origin. In many cases its lower extremity can be brought into view by gently forcing apart the borders of the anal orifice.

The treatment advised by the authorities above cited for this most painful affection comprises two plans.

The first includes laxatives, enemata, and escharotics or healing ointments applied directly to the ulcer. If these means do not succeed,—and their success is a rather rare exception to the rule,—division of the sphincter ani by the knife, as first proposed by the French surgeon, Boyer, many years ago, is the alternative. This remedy is generally prompt and certain; but it is a cutting operation, requiring some little time for recovery, and patients, through exaggerated fear of the knife of the surgeon, will often continue to suffer rather than submit to it. There is another operation, not involving the use of the knife, and bloodless in character, which is equally prompt and sure, and which need not confine the patient to his bed more than a single day. I refer to *forcible dilatation* of the *sphincter ani* muscle. This process has been employed, I am aware, by several of my surgical friends; but I think that its simplicity,

safety, and thorough efficiency as a substitute for the knife is not as generally appreciated by the profession as it should be. According to my belief, it is the proper remedy for the disease under consideration, and a glance at the pathology of irritable ulcer and the physiological condition of the sphincter muscle will, I think, establish the position.

The immediate cause of the peculiar and insupportable pain of an irritable ulcer of the rectum is the constant and involuntary spasmodic contraction of the sphincter ani muscle, by which the sensitive sore is continually squeezed and pinched. This explanation is in accordance with the latest physiological researches. In the Transactions of the Academy of Sciences of Paris, of the 8th of June last, the result of certain experiments made in his laboratory by MM. Gianuzzi and Newrocki was presented by Prof. Bernard, of the College of France, as to the "influence of the nerves upon the sphincters of the urinary bladder and anus." This is their conclusion:—

"The preceding experiments appear to us to demonstrate that the sphincter muscles of the bladder and anus are, during life, in a constant state of tonic or involuntary muscular contraction, which state is due to the influence of their nerves."

Now, it is fair to infer that the presence of a painful ulcer, seated on that portion of the mucous membrane of the rectum which is grasped by its sphincter muscle, must, through the medium of reflex action, greatly intensify the nervous influence which stimulates this contraction. And the fibers of the muscle, thus stimulated to constantly increased spasmodic effort, are continually subjecting the already tender

sore to the mechanical violence of compression and bruising, by which it is at the same time prevented from healing and rendered so exquisitely painful. It must also be remembered, as shown by Todd and Bowman and Brown-Séquard, that the fibers of a muscle, when stimulated to action, either by the will directly, or indirectly by reflex irritation, do not contract simultaneously and then relax altogether; but that each separate fasciculus or bundle of ultimate fibers—the aggregate of which make up the muscle—contracts and relaxes by itself, each, to a certain degree, independently of its neighbor; and thus, like the keys of a piano under the fingers of a rapid performer, all these separate fasciculi, as long as the stimulating cause continues, are playing in succession upon the painful ulcer.

The pain thus produced varies both in degree and in duration. It may be slight and transient, or it may be almost insupportable in severity, and last eight or ten hours. The act of defecation itself is often accompanied by a slight degree only of soreness, and there is generally an interval of ease after defecation, before the peculiar pain of the disease sets in, and this interval is longer if the stool be solid in consistence.

If this view be correct as to the cause of the pain in this disease, it follows that any means by which the contractile power of the sphincter is interrupted or temporarily abolished will relieve it at once. Its division by the knife illustrates the fact. Now, it is well known that forcible stretching of muscular tissue will temporarily impair its contractility. The paralysis of the bladder, which so often follows its

overdistention in retention of urine, is an example of this. And thus it is explained why forcible dilatation or stretching of the anal orifice arrests at once the pain of an irritable ulcer of the rectum, and is followed by its speedy cure. That this result is safe, sure, and reliable, can only be demonstrated by clinical facts, and these I will endeavor to furnish.

Richard Quain, in his excellent treatise on diseases of the rectum, after stating that the interval that elapses between the evacuation of the bowels and the occurrence of pain varies from ten minutes to two hours, adds: "I cannot explain at all satisfactorily why an interval of time elapses between the application of the exciting cause and its effect; nor can I account for the variations in its length." To me it seems plain, that the dilatation to which the orifice of the anus is subjected, by the extrusion of the feces during the act of defecation, is sufficient to prevent the fibers of the sphincter muscle from resuming their full tonic contractility for a short interval; and that the length of the interval depends entirely upon the size and hardness of the mass extruded, and the amount of stretching to which the orifice has been subjected.

Now, the operation of forcible dilatation, as I have been in the habit of performing it, by introducing the two thumbs into the anus, flexing them so as to include the breadth of the sphincter muscle, and then, taking a purchase with the outstretched hands from either buttock, drawing them forcibly asunder until arrested by the ischial tuberosities, effects such a stretching of its fibers as to paralyze the sphincter for at least a week, during which time the ulcer

assumes a healthy appearance and rapidly heals, the pain ceasing entirely from the time of the operation.

CASE.—A gentleman of forty-five was under my care for chronic phthisis in 1861, and, through change of diet and habits and removal to the country, improved very much in health. Early in the present year he came to the city for relief, having relapsed for several months in consequence of suffering severe "agonizing" pain after going to stool, which had led him to neglect the calls of nature. His appetite was gone, and he was losing flesh. The present trouble had its origin in costiveness. He had no great pain at the time of defecation, but about half an hour afterward an indescribable smarting, stinging, and boring pain would come on, and last for three or four hours. I suspected the cause of his trouble, and the next day, with the assistance of Dr. Foster Swift, had him etherized, and explored his rectum. On its coccygeal aspect, just within the verge of the anus, we saw an unhealthy-looking ulcer, about the size of the finger-nail, with elevated edges and a dirty, yellowish surface. I stretched the anus with the thumbs, in the manner above described, and ordered a dessert-spoonful of castor oil at bedtime. The operation was followed by no pain, and the next morning he had a stool without pain—"just the slightest possible feeling of soreness"—as he described it, and much to his gratification there was none of the "agony" afterward. It has never returned; and with proper care he has regained a very fair condition of health. He was confined to the house one single day.

CASE.—An English lady of thirty-five was sent to me by my friend Dr. Sabine, in 1861. She had been suffering excessive pain after defecation for more than a year, to relieve which she had resorted to the use of opium in considerable quantities. She was a woman of strong character and excellent morale, and, mortified by the habit she had acquired, she had determined to break it, and bear the "bitter pain," as she termed it, by embarking on a voyage to China to join her husband, without any opium in her possession, and with this resolution had come to New York. I examined the rectum, and finding an ulcer in the same part of the gut as in the last case, dilated the sphincter on the spot. A thrombus about the size of an English walnut formed around one side of the anus within a few minutes after the operation, but she complained of no after-pains. The next morning, being accustomed to their use, she took an enema of tepid flax-seed tea, had a free evacuation, with very slight inconvenience, and no return of the "bitter pain." She went out every day, complained of little or no local soreness, and started on her voyage without any opium, and without any necessity for its use.

The thrombus in this case resulted from the rupture of a superficial vein. I have also, in several instances, lacerated the mucous membrane in dilating the anus, but have never seen the slightest trouble follow either of these accidents. The paralyzed and quiescent condition of the sphincter after dilatation secures rest and protection from violence to the parts within its grasp, and the process of repair takes place at once, and is rapidly completed.

Case.—A perfectly healthy young lady was married at twenty-two, and within a month after her marriage injured herself while straining at stool. From this time the act of defecation was always followed at a variable interval by intense and insupportable pain of several hours' duration. To avoid this she resisted the desire to have a passage, and gradually lengthened the interval to a week or ten days, when she would take a dose of medicine and suffer for twenty-four hours. She was treated in a western city at different times for piles and stricture, and was even suspected to have cancer, but, procuring no relief, she finally came to this city last spring, having suffered more than two years. She described her suffering after stool as excruciating; it lasted from eight to ten hours. Her husband told me that sexual intercourse brought on her pain. I found the sphincter ani very much contracted, but the introduction of the finger discovered none of the hardness of cancer, nor any evidence of stricture within its reach; but a rough and exquisitely sensitive spot toward the coccyx suggested the existence of irritable ulcer. With the assistance of my friend Dr. Emmet, she was etherized, and by the aid of the speculum the ulcer was brought readily into view, presenting the appearance described in a former case. There was no other evidence of rectal disease. I dilated the sphincter at once and thoroughly, and in doing so produced two linear lacerations of the mucous membrane, each three-quarters of an inch in length. Very slight soreness followed, and the next day, by the aid of a dose of castor oil, she had several large passages, which, for the first time in two years, were followed

by no pain whatever. At my next visit her expressions of gratitude and surprise were very pleasant. At the end of a week we again used the speculum, and found the irritable-looking ulcer transformed into an innocent, healthy sore, with thin white edges and a granulating center, presenting half its previous size. The lacerations produced by the operation had entirely healed, leaving no trace. She used daily enemata for another week, and then a dinner pill at night, as required, and when she left the city, at the end of a month, was perfectly well.

Her long-continued and severe suffering had given to this lady's face a painful expression, characteristic of her disease; and her complexion was sallow from habitual constipation. After her cure, the change in her appearance was remarkable.

I have been asked whether the paralysis of the sphincter ani, produced by forcible dilatation, is ever followed by incontinence or loss of control over the contents of the lower bowel. The relaxed and flabby appearance of the orifice of the anus after the operation certainly suggests this idea, and the fact that when the patient is asked to contract his sphincter by voluntary effort, he generally expresses his inability to do so, looks in the same direction. But, in answer to the question, I must say that in upwards of twenty cases which have come under my observation, I have never seen any indications of incontinence, and that I believe the internal sphincter to be equal to any emergency likely to arise during the temporary suspension of the functions of the more powerful external muscle.

I have reason to believe that in some cases the muscular fibers of the sphincter are actually ruptured

or torn in the stretching process; but no harm or delay in the cure has resulted from this. My colleague, Dr. W. R. Donaghe, tells me that, after doing the operation, he once felt distinctly, through a laceration in the mucous membrane of the rectum, a gap in the substance of the sphincter. The case did well, and the cure was perfect.*

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* The following is a note of Dr. Donaghe's case, which he has kindly furnished me:—

Case.—Timothy McMahon, aged forty-five, a stout, well-built laborer, came to the Demilt Dispensary, August 1, 1862, complaining of "pain in the lower end of his bowel after a passage." He stated that his bowels had been generally regular, and that during the last four years he had been troubled with bleeding once or twice a year, lasting four or five days. His present complaint began six months before his visit to the dispensary. He said that he had a passage every morning, causing some sense of soreness as it came out, and that when it was over, *without any interval*, there began "a great pain," which he likened to that felt by a woman in labor; that it lasted about four hours; that after its cessation he felt perfectly well until the next day; but when the pain was upon him he could do nothing, so great was his suffering, and consequently he had been obliged to give up his daily labor. On examination with a rectal speculum I found several small internal piles; and in front of the coccyx, on the upper part of the mucous membrane lining the external sphincter, there was a small round ulcer, a little larger than half a pea, with a reddish and ungranulating surface and slightly thickened edges. I touched it thoroughly with nitrate of silver, but without relief. On August 23d I gave him ether, and, introducing the index and middle fingers of both hands into the rectum, I pressed slowly but firmly toward the tuberosities of the ischia. During this movement I felt a distinct sensation of something giving way, which I supposed to be the sphincter muscle. After this occurrence there was no further resistance, but the margin of the anus became very lax. I examined with my finger toward the coccyx, and recognized a distinct laceration of its mucous membrane, the rough edges of which could be easily felt; the joint of my finger imbedded itself in the submucous cellular tissue. He complained of severe pain when the effects of the ether passed off, and I gave him a grain of opium. On the third and fourth days he had passages, and said that the "straining was not felt." On the eighth day I saw him again. He had had a passage every day without subsequent suffering. I ex-

This remedial measure has a wider application than to the treatment of irritable ulcer of the rectum. In inflamed hæmorrhoidal tumors, or any painful inflammatory affections of the anus, where the spasmodic contractions of the sphincter constitute the principal source of the pain and obstruction to the circulation, the stretching of the sphincter, with or without the intervention of an anæsthetic, will afford prompt and certain relief. It is equally applicable to the affection described by some authors as "spasm," and by others as "painful contraction" of the sphincter,* and also in the "neuralgia of the anus" of nervous subjects and hysterical women.

I have been in the habit for several years past of employing this manœuvre after the operation for the cure of hæmorrhoidal tumors, whether by ligature or the use of the *ecraseur*. The result has been always favorable. The patient is saved entirely from the severe pain, generally lasting several days, which is caused by the pinching of the tender and inflamed parts by the spasmodic contractions of the irritable sphincter. By throwing it out of play, the suffering

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amined the part with a Sims speculum. In front of the coccyx there was a vertical, oblong sore about three-quarters of an inch in length and half an inch in breadth, covered with healthy granulations. I did not see him again for several weeks, at the end of which time examination showed that the sore had entirely healed and the mucous membrane was in a state of perfect integrity. I have seen him a number of times during this year, (1863,) and he has had no sign of relapse.

* Boyer, *Traité des Maladies Chirurgicales*, etc., 4th edition, tome x. pp. 139–150.

Dupuytren, *Leçons Orales*, tome iii. pp. 284–6.

Brodie, *Lectures on Diseases of Rectum*, in *Lond. Med. Gaz.*, vol. xvi. p. 26.

Quain, *Diseases of the Rectum*, N. Y., 1855, pp. 177–180.

after the operation is reduced to a very moderate degree of local soreness, and the necessity for the employment of the catheter, through sympathetic disturbance of the sphincter of the bladder, is abolished.

CASE.—I was requested by Dr. R. F. Clow, of West Twenty-seventh Street, to see one of his patients, who had been suffering for many years with "bleeding piles," and who was at the time confined to his bed with a very painful aggravation of his malady. I found a gentleman of thirty, pale, nervous, and broken down by loss of blood, complaining bitterly of throbbing and lancinating pain at the anus, accompanied by almost constant desire to go to stool. When he did so, he voided nothing but a little bloody mucus without relief; and this had lasted more than a week. On placing him in a position in which I could inspect the parts, I found a mass of inflamed rectum and hæmorrhoidal tumors protruding beyond and embraced by the sphincter; and detected also an elongated and unhealthy ulcer situated between two of the tumors. I greased my thumbs and gently introduced first one, and then the other, into the orifice in the center of the protruding mass, and, grasping either buttock with the outstretched fingers, steadily and forcibly stretched the sphincter muscle. The pain was not as severe as might be supposed, and he allowed me to reduce the inflamed parts within the orifice. I promised him relief from his pain, and advised an operation for the radical cure of his piles and prolapse as soon as the inflammation should have subsided, and meanwhile that he should use a daily

injection of tepid flaxseed tea with a Davidson's tube, to secure soft stools. At the end of a week I was informed that my operation had relieved the severe pain, and that he was ready to have his tumors removed. I explored his rectum the next day under ether, and found, in addition to the hæmorrhoids, not less than three ulcers, not very unhealthy in appearance, and situated between the tumors. I applied the ligature to four tumors, and finished by dilating the sphincter a second time. The patient had no severe pain after the operation, recovered rapidly under the judicious care of Dr. Clow, and presented himself to me at the end of a month entirely well and very much improved in health and appearance. He had a daily stool without pain, protrusion, or loss of blood, and was exceedingly grateful for the result.

I might continue to relate cases in which forcible dilatation of the sphincter ani has been employed with results not differing from those already stated, but fear to tire your patience. The cases I have described embrace most of the prominent points in connection with the operation which my experience furnishes. I will only add that I have acquired great confidence in its efficiency as a substitute for the knife, and that its simplicity and the facility with which it is effected, together with its wide range of application as a prompt remedy in a common and very painful class of diseases, appear to me to justify its more general adoption as an established operation of surgery.

This operation was originally proposed by Recamier, of Paris, but I have been unable to find any record of its employment by his immediate successors. Some

fifteen years ago I saw in the *Gazette des Hôpitaux*, of Paris, a proposition on the part of Maisonneuve to cure fissure of the anus by introducing the hand into the rectum, closing it firmly, and then withdrawing the closed fist by main force. This mode of operating met with no favor, although Maisonneuve states that he employed it successfully. Shortly after this I was told by my friend Professor Metcalfe, of this city, that he had stretched the sphincter ani in painful conditions of the anus with benefit.

Sedillot, in his *Operative Surgery*, published in Paris in 1855, speaks of forced dilatation as a remedy for fissure of the anus, and describes an operative process, but gives no results. Nelaton, of Paris, also alludes to it in highly favorable terms as worthy of trial since the discovery of anæsthesia, but gives no experience. I have heard of its employment in this city by Dr. Gurdon Buck, Dr. John Burke, of East Broadway, Dr. Isaac Cummings, and others.

On the other hand, I can find no allusion to it in any of the English works on Diseases of the Rectum.

CASES

OF

VESICAL CALCULUS

TREATED BY LITHOTOMY AND LITHOTRITY.*

I.

STONE IN THE BLADDER FORMED UPON A FRAGMENT OF CATHETER, IN A PATIENT WITH STRICTURE OF THE URETHRA, SUCCESSFULLY TREATED BY LITHOTRITY.

Mr. J. L., forty-three years of age, had been under my care from time to time for several years, with an old permanent stricture of the urethra, complicated with catarrh of the bladder. I had succeeded in dilating his stricture at three several periods, so as to receive a No. 8 or 9 with ease, and had very much improved the condition of his bladder by the use of injections of nitrate of silver; but on each occasion he abandoned the treatment, satisfied with this partial improvement, and as often allowed his stricture to contract again.

In March, 1851, his condition was such that he was in the habit of introducing a No. 5 flexible catheter eight or ten times in the course of the twenty-four hours, and of urinating as often as every half hour,

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* From the New York Medical Times, vols. ii. and iii.

night and day, his urine containing much adhesive mucus, and possessing the usual offensive odor. To enable him to pass the instrument with more facility, he was in the habit of bending and slightly breaking the extremity of each of his catheters opposite to its last eye—a manœuvre not unfrequently employed by old stricture patients. After introducing, one night in the dark, a catheter prepared in this manner, and which had become worn out in service, he found, to his dismay, that its broken end had become detached, and remained behind the stricture. He immediately introduced another instrument, and succeeded, as he supposed, in pushing the fragment into the bladder.

Some six weeks after this occurrence, he presented himself to me with an aggravation of all his sufferings, and already with unmistakable symptoms of the presence of a foreign body in the bladder. His urine was occasionally bloody, its stream would often stop suddenly during emission, he had an increased sense of weight at the fundament, and the jolting of a carriage caused him unbearable suffering. After some delay in dilating the stricture, which was very firm and unyielding, I succeeded in striking a small calculus, about two months after the accident.

The small size of the concretion induced me to attempt the dilatation of the urethra, with the view of securing its spontaneous expulsion, or, failing this, of permitting the introduction of the scoop lithotrite.

As the patient's general health was much broken, and his nervous system exceedingly irritable, he was put upon the use of sulphate of quinine. To quiet the irritability of the bladder, he was confined to his room, and to the recumbent position. The dilatation

of the urethra was carried on as rapidly as the state of the bladder would allow, and the latter organ was injected at short intervals with warm water and a solution of nitrate of silver.

When I had carried the dilatation so far as to allow the introduction of a No. 12 steel sound, his condition was so far improved that I felt warranted in leaving a silver catheter of this size in the bladder for some hours together. This exciting no additional irritation, it was allowed to remain until the urethra suppurated freely; the size of the catheter was, in a few days more, gradually increased to No. 16, the urethral orifice having been incised to a slight extent with the bistoury in order to admit it; and an instrument of this size was kept in the passage until it passed with the most perfect freedom.

By causing the patient to retain his urine as long as possible, and by distending the bladder to its utmost capacity with injections, I now endeavored to solicit the escape of the calculus through the urethra thus dilated to its fullest extent,—but without success. I then determined to introduce the lithotrite; and, as the nervous excitability of the patient was still sufficient to interfere seriously with the successful employment of this instrument, I decided to administer chloroform during its introduction. In this manœuvre I was more successful; the bladder was injected, the scoop instrument employed, and with very little delay the calculus was felt, caught, and crushed. On withdrawing the lithotrite, I was pleased to find the fragment of catheter between its jaws; not so much so, however, as the patient was, when he awakened from his sleep to find himself rid of a source of so much apprehension to him.

The crushed debris of the calculus were entirely passed during the forty-eight hours succeeding the operation, which was followed by the slightest possible increase of irritation. It is needless to say that all symptoms of stone disappeared at once; the vesical injections were persevered in for a short time, and a steel sound of the largest size directed to be introduced daily.

The patient has persevered in the use of his instrument to the present time. I have seen him within a few days past; his bladder is entirely free from irritation, he passes a full stream of urine at proper intervals, and has grown robust and fleshy. He considers, and justly, that the breaking of his catheter was, on the whole, a lucky accident, inasmuch as it led to the cure of his stricture.

II.

LITHOTOMY IN AN ADULT—HEMORRHAGE KEPT UP AFTER OPERATION, BY VOMITING FOLLOWING USE OF CHLOROFORM, AND RECURRING AT A LATER PERIOD FROM A DIFFERENT CAUSE.

In the month of January, 1851, I removed a calculus of moderate dimensions, and consisting mainly of the ammoniaco-magnesian phosphate, from the bladder of Mr. J. A., of Patterson, N. J., twenty-seven years of age. Chloroform was administered; its effect was satisfactory; the hemorrhage at the time of the operation was trifling; and the patient was left in a very comfortable condition at about two o'clock P.M. About six o'clock on the same evening I was summoned in haste to my patient, whom I found quite exhausted

by loss of blood. I learned that soon after I left in the morning, the drowsiness succeeding the full effect of the chloroform had passed off, and he had vomited freely, and that the vomiting had continued to recur at intervals of fifteen to twenty minutes since that hour, each attack of vomiting being accompanied by an increased gush of blood. The cloths which had been removed from beneath him showed that the loss had been considerable. I examined the wound in a good light, and finding no arterial bleeding of consequence, concluded that the straining which accompanied the constant retching had prevented the formation of coagula, and that the continued oozing had been thus kept up. A fresh cloth was placed beneath the patient, his thighs bandaged together, a sinapism applied over the epigastrium, and a little brandy and morphine administered internally. There was no return of either vomiting or bleeding; and the case did perfectly well until the tenth day, when quite smart hemorrhage again occurred, but evidently on this occasion from another cause. I found the patient a good deal alarmed, and with an arterial oozing from the upper angle of the wound, about the situation of the bulb of the urethra, which, I presume, had been wounded at the time of the operation. I administered a full dose of opium, elevated his hips, injected the wound with a cold, strong solution of the subacetate of lead, and made pressure over the bulb with the finger and a pledget of lint for about twenty minutes, when it seemed to be controlled. He was carefully watched afterward, and the bleeding did not return.

I found, on inquiry, that, previous to this second hemorrhage, the patient had received some visitors,

and had also noticed a pretty decided though not a complete *erection* for the first time since the operation; and to this circumstance it was probably attributable.

Several other cases have since come to my knowledge, in which secondary hemorrhage, after lithotomy in adult males, has occurred about the same period, seemingly assignable to a similar cause. I do not remember to have seen any record of instances of hemorrhage arising under these circumstances; but I should be disposed to adopt appropriate precautions in view of its possible occurrence.

The patient subsequently made a good recovery.

III.

LITHOTOMY IN A CHILD—CONGENITAL URIC ACID CALCULUS OF VERY SMALL SIZE—CHLOROFORM.

THOMAS CUDBIRTH, three years of age, was brought to me by his father, in January, 1848, with evident symptoms of stone in the bladder, which, on examination, proved to be the case. He had never passed his water since his birth without more or less evidence of pain, as I was subsequently assured by both of his parents, and had been in the habit of pulling at his prepuce from a very early period. The child was very uncontrollable; and I experienced some difficulty in detecting the calculus, although a small sound with a short curve was employed. The moment the instrument entered the bladder, its liquid contents would be projected with force, and the sound grasped im-

movably as by a vice; and thus the operation of sounding was necessarily repeated several times.

I performed the lateral operation on the first of February following, and found the calculus, which consisted entirely of uric acid, to weigh but nine grains. The child recovered rapidly and entirely. Some incontinence of urine continued for six months following the operation.

Mr. Martineau, of Norwich, England, is said by Crosse, in his prize essay on Urinary Calculus, to have extracted a calculus weighing only ten grains from a boy thirteen years old; and this is spoken of as being the smallest probably ever removed by operation.

This case is the first in which I ever employed chloroform in lithotomy; and I was surprised to find how much larger a staff could be introduced into the bladder under its influence, and also at the immense advantage it afforded in exploring this organ, as well as in the execution of the operation. I have since used the chloroform in nine cases, of which I have preserved a record, and in no instance with the slightest ill effect, with the exception above recorded in the case of Mr. J. A., where its administration was followed by vomiting.

From the experience which I have had of the utility of anæsthetics in lithotrity also, it seems to me that their use has been unwisely proscribed in this operation. In support of this view, however, I hope to offer some cases in evidence hereafter.

The *earliest age* at which I have had occasion to cut for stone in the bladder is two years and one month. A calculus composed of the triple phosphates,

and weighing within a few grains of two drachms, was extracted from a male child of this age in Yorkville, in April, 1846. The urine ceased flowing through the wound on the ninth day, and it was entirely healed in the third week.

Another case in a boy of two and a half years occurred to me in March, 1848. The calculus was similar in composition, and nearly as large. The child was a native of this city, and born of German parents. He also recovered rapidly and entirely, no incontinence of urine following the operation.

IV.

CALCULUS IN A FEMALE INFANT, EIGHTEEN MONTHS OLD, EXPELLED THROUGH THE DILATED URETHRA.

In 1849, an Irish woman brought her child to my office, complaining that during a year past the infant, who was still nursing, had been constantly fretting, and affected with severe fits of crying, and straining to pass its water. The efforts at micturition were very frequent, and but a few drops would be passed at a time. The child was in the habit of rubbing the privates a great deal—so much so as to keep the vulva constantly irritated and sore. She had been taking nitre and parsley-root tea, without relief; and the symptoms had been supposed to depend upon dentition, and also upon the presence of worms in the rectum, for which she had been treated, but ineffectually. I examined the vulva, and then passed a director into the urethra and bladder, where I was sur-

prised to strike a calculus. It was apparently small, but readily and distinctly to be felt. I commenced dilating the urethra with the intention of introducing a pair of dressing forceps, and in this manner endeavoring to secure the calculus. A sound of the size of No. 9 had thus been passed with ease, when, on her next visit, the mother stated that the baby had had but one crying fit since the last operation, when she had passed a "bit of whitish gravel as large as a small bean," and had since been entirely free from pain. Unfortunately the "bit of gravel" had been mislaid and lost. I explored the bladder again, but found nothing. The child remained well.

V.

STONE IN THE BLADDER—LITHOTRITY, CYSTITIS, ETC.—LITHOTOMY —SUCCESSFUL RESULT.

In December, 1851, * * * * thirty-five years of age, came under my care for an affection of the urinary organs, with which he had suffered more than two years. His symptoms consisted mainly in a sensation of weight and uneasiness in the pelvis, extending from above the pubes to the rectum, somewhat increased during and after passing water. He made water no more frequently than natural; his digestion was good; and, with the exception of a somewhat excitable nervous temperament, his general health and condition were excellent. He stated to me that he had already been treated for stricture, mainly by the use of flexible bougies, and was disposed to give

this title to his ailment. The description which the patient gave of his symptoms, although rather vague and unsatisfactory, was not inconsistent with this idea; and I was consequently surprised, on introducing a full-sized steel instrument, which passed readily into his bladder, to find it in contact at once with a *calculous mass*, evidently of considerable size.*

When Mr. ——, with the information which I afforded him, had arrived at a full comprehension of his situation in the new aspect which his disease had assumed, he expressed so strong a desire to be subjected to the crushing operation rather than to lithotomy, that I concluded, after due consideration, to accede to his wish. His bladder was healthy, bearing the presence of an instrument in its cavity without any evidences of unnatural sensibility; his urine, on examination, was found to be normal, containing no appreciable amount of mucus; his urethra, although at first irritable, was found to be capacious and manageable; in fact, the only objection to lithotrity consisted in the large size of the calculus.

The lithotrite was accordingly employed at an early day; and the first time the stone was caught, its large size was demonstrated, as the scale near the handle of the instrument indicated (in *centimètres*) a diameter of two inches, less one line.

The operation was managed in the usual manner; no anæsthetic was employed, and he was instructed

* The usual symptoms of stone in the bladder were singularly absent in this case; in fact, the presence of the calculus did not seem to have produced the ordinary amount of irritation in the bladder; nor did he seem ever to have suffered the tormenting symptoms so characteristic of this disease.

to allow his urine to accumulate before the instrument was introduced, and thus injection of the bladder was not required: at first it was performed at my office; afterward, as more prudent, at the patient's house. The interval between the operations varied from eight days to three weeks; and we had reached the eleventh *séance*, in the month of June, 1852, before any symptoms whatever of an unpleasant nature occurred. I had up to this time not failed to catch and crush from two to four fragments at each operation, and a very large quantity of debris had been passed, and saved. On one occasion, a fragment of considerable size became impacted in the urethra, for the removal of which it was necessary to employ the urethral forceps, with which it was withdrawn without difficulty.

After the eleventh operation, the patient, who had always been directed to remain within doors for at least forty-eight hours after the use of the instrument, committed an unwarrantable imprudence, by which he brought on an attack of acute cystitis.* He hesitated to send for me, in consequence of his breach of faith, and resorted to opium, in the shape of McMunn's Elixir, to control his excessive pain. In addition to this, on the second night after the attack of cystitis, fancying that the violent tenesmus and straining might arise from a fragment impacted in the urethra, he sent for a stranger, who passed or attempted to pass instruments, from which he suffered exquisite pain, and after which he voided blood. I mention these facts as possibly accounting for the presence of

* Finding himself feeling very well, he had gone the same afternoon to a drove-yard to see some prize cattle belonging to a relative, was caught in a shower, and wet to the skin.

an abscess found subsequently between the prostate gland and the rectum. I was summoned finally on the fourth day, and found the patient nearly narcotized by opium, and in a very serious condition. After the lapse of several weeks, under appropriate treatment, this unfortunate attack was recovered from, but the bladder never entirely regained its original healthy condition; the patient on slight exposure would find his urine depositing the peculiar adhesive mucus characteristic of catarrh of the bladder; and he persisted in resorting to anodynes on the slightest recurrence of pain. It was only after a residence in the country of some three months that I ventured again, with the utmost care and precaution, to employ the lithotrite, and I found that I had now a very different condition of the organs to deal with: the use of the instrument caused extreme pain; his nervous system was rendered excessively irritable by the constant use of opium; much pain and some catarrh, caused partly by the manipulations of the instrument, and partly by the sharp angles of the new fragments, followed each operation, although repeated at long intervals; and he insisted upon the administration of an anæsthetic on each occasion, which indeed his great restlessness and want of self-command rendered indispensable.

In this state of things, I soon became satisfied that lithotrity was no longer a suitable operation for my patient; in fact, I should not have repeated it after the attack of cystitis, but for the hope that one or two more applications of the instrument would suffice to bring away the remaining fragments of the stone, which were presumed to be not very large in conse-

quence of the very considerable amount of calculous matter which he had already voided—amounting in all to 3xj, (apothecaries' weight,) not estimating the proportion necessarily lost. I accordingly advised him, as soon as his condition would justify it, to submit to the knife.

The propriety of this course was confirmed by the advice of Dr. S. R. Childs and Prof. A. C. Post, who, together with Dr. C. E. Isaacs, had seen the patient with me in consultation. His condition had become meanwhile by no means favorable for an operation; the irritation of the fragments, his own imprudence in exposure to the weather, and the constant use of anodynes and stimulants, had established chronic inflammation of the bladder; he was subject to frequent chills followed by sweating, his digestion was impaired, his urine alkaline, and his pulse constantly too frequent. In addition to this, he was subjected to other depressing and unfavorable circumstances which I am not at liberty to detail. Several months of unremitting care, therefore, necessarily elapsed before it was thought advisable to operate; and it was not until the 12th of January, 1853, more than a year from the date of the commencement of his treatment, that the operation was performed.

In connection with the operation, there were several circumstances of unusual interest. Besides the gentlemen named above, I had the assistance of Drs. J. R. Wood, G. A. Peters, and Riggs. After the administration of chloroform, it was found impossible to introduce a staff into the bladder, although several instruments of different sizes and curves were tried by Drs. Post and Wood, as well as by myself. I suc-

ceeded finally, however, in introducing, without force, a simple steel sound of medium size, and possessing a very short curve; and upon this instrument I determined to cut into the bladder. Its convexity was bared by means of the usual incision for the lateral operation through the perineum; and through the opening into the urethra thus made, I inserted the extremity of a full-sized silver director, purposing to carry this instrument into the bladder alongside of the sound, and upon it as a guide to incise the prostate gland. Its point, however, was arrested by some obstacle before it entered the bladder, and I could not succeed in feeling the stones with it. I prolonged my incision, nevertheless, upon the director, laying open the urethra onward toward the neck of the bladder—some pus mixed with urine escaped; and on withdrawing the director and introducing the finger, I recognized distinctly that I had cut into an old abscess, about the size of an English walnut, situated between the prostate gland and the rectum. In feeling around the walls of this abscess, I detected, with the point of the finger, an orifice which seemed to open into the prostatic portion of the urethra; and through this orifice I again introduced the director, which now evidently entered the bladder and came in contact with a fragment of the stone. I now withdrew the steel sound from the bladder, and, cutting with the beaked knife upon the groove of the director as upon a straight staff, made an incision of moderate extent into the neck of the bladder and prostate gland. The finger introduced through the wound detected the position of the fragments, which were caught and withdrawn by the forceps without

further delay; they were four in number, their surfaces worn smooth by attrition, and their united weight about ℥iijss. The hemorrhage was slight; the bladder, as well as the cavity of the abscess, was well washed out with warm water slightly acidulated, at the suggestion of Prof. Post, by a few drops of nitric acid. I satisfied myself that the abscess was fairly laid open throughout its whole extent, and the patient was then put to bed in a passably comfortable state. He rallied well from the operation, and, without any addition to the usual treatment of a stone patient after lithotomy, he slowly and gradually made a full and perfect recovery.

In a little more than two months after the operation he was perfectly well, and resumed his business occupations. A month later he called at my office, and, after stating that he was perfectly free from all trouble about the urinary organs, mentioned, casually, that he had noticed occasionally a little moisture about the cicatrix of the wound in the perineum, not accompanied, however, by any uneasy sensations whatever. I placed him in a good light, and detected, at the upper extremity of the cicatrix, a minute orifice, out of which I succeeded in squeezing a drop of serous fluid. Into this orifice I introduced a probe of the smallest size, and carried it in, with some management, to the depth of an inch, when it came in contact with a small mass of calculous matter. This I concluded was either a concretion since the operation, or a fragment left at the time of its performance, which had lodged in the cavity of the abscess, out of the current of the urine, and had thus been retained. I proposed to dilate the sinus, and

remove the fragment with a delicate pair of forceps; but it causes him no inconvenience, and he is still deferring its removal.

In concluding the account of this case, which caused me during its progress no little anxiety, and which terminated more favorably than I had a right to expect, I will remark that, apart from the unfortunate *morale* of the patient, the large size of the calculus, and the number of operations consequently required for its removal, was the main cause of the failure of lithotrity.

The abscess opened during the last operation, the urethral orifice of which prevented the use of a staff by entangling its point, may have been entirely symptomatic; but I am disposed rather to attribute it to a laceration of the urethra, either by a fragment of calculus, in passing, or by the instruments employed by others, or by myself.

VI.

URINARY CALCULUS IN AN ADULT, WITH VERY IRRITABLE BLADDER —LITHOTRITY ASCERTAINED TO BE IMPRACTICABLE—CURE BY THE LATERAL OPERATION.

Mr. R. G., of Hoboken, a robust, hearty man, fifty-four years of age, and the father of a large family, came to me in August, 1852, with unmistakable symptoms of stone in the bladder. His sufferings were very severe, and had been gradually increasing in intensity since their first commencement, about eighteen months before. His calls to make

water were more frequent than natural, averaging once in two hours, and during the night he generally rose twice or three times. Just at the close of the act of urinating, the pain was always most acute; and it was not uncommon for his urine to be deeply tinged with blood. I learned, also, that for some months it had deposited habitually an appreciable quantity of adhesive mucus. While passing water it happened not unfrequently that the stream would be suddenly arrested before the bladder was entirely evacuated, and the sudden stoppage of the stream was always accompanied by excessive pain. During the intervals of micturition, he was conscious of a constant uneasy sensation at the neck of the bladder, extending backward to the fundament. For some weeks together his symptoms would diminish, and sometimes almost disappear; when, after a ride or some rough exercise, they would return with increased violence. During these "fits of the stone," he always was annoyed by an intense burning sensation in the soles of the feet.

On introducing a solid steel sound into the bladder, I found the urethra healthy; recognized a solitary calculus of moderate size, and satisfied myself that the bladder was exceedingly sensitive, and the patient very intolerant of pain. Examination by the rectum showed the prostate gland to be healthy; there were also two hæmorrhoidal tumors, attended by a moderate amount of prolapse of the gut.

I advised Mr. G. to submit, as soon as he could make the necessary preparations, to the operation of lithotomy; but he had been consulting with a former patient of mine, who had been relieved by the crush-

ing process, and had evidently conceived a strong preference for this mode of operating. In short, he insisted so strongly that at least the lithotrite should be tried, that a fortnight after the first sounding I introduced a crushing instrument of medium size. I had scarcely moved the instrument in search of the calculus, when the bladder contracted spasmodically upon its contents; the warm water that I had injected was forced out of the urethra, alongside of the instrument, and the pain which followed was so great that it was at once withdrawn. Some increased irritation followed this experiment. My patient not being yet satisfied, the lithotrite was again introduced some three weeks later, while he was under the influence of chloroform. There was much less difficulty experienced on this occasion, and I was able to get a very good idea of the shape and size of the calculus, which I seized between the jaws of the instrument; but fearing the increase of trouble that might follow from the presence of sharp and angular fragments, it was abandoned unbroken. So much irritation succeeded this application, that I positively declined any further attempts at lithotrity in his case; and, after some delay, during which Dr. Mott saw him with me, and confirmed the necessity of a cutting operation, he finally consented to submit to it. He was now suffering excessively, and his urine was constantly loaded with blood and mucus—the mucus looking very much as if it was mingled with pus, although the microscope did not confirm the presence of the latter. He was placed upon the use of the decoction of the pareira brava, with alkalies, for several weeks longer; but as there

was no decided amelioration of the vesical irritation, and little prospect of any while the stone remained in his bladder, it was concluded to remove it at once. This was accordingly done, by the lateral operation, on the 8th December, with the assistance of Drs. Mott, Metcalfe, Isaacs, and J. Thompson, of Hoboken. Chloroform was employed, and with entire success. The calculus, which was about one and three-quarter inches in length, in its longest diameter, was accidentally crushed in withdrawal, and this circumstance rendered it necessary to employ more care in securing all the fragments. There was some hemorrhage; and as the patient was at a distance from my residence, it was thought safer to leave a sponge and canula in the wound. This was withdrawn in forty-eight hours; and the patient made a rapid and perfect recovery, uninterrupted by a single unpleasant symptom.

In this case, the insuperable objection to lithotrity was the irritable condition of the bladder, which was materially aggravated by the three explorations—of which the two latter could have been omitted with advantage to the patient. The rapid restoration of the bladder to a healthy condition after the removal of the stone is worthy of remark, especially after the additional manipulation rendered necessary by its breaking into fragments under the pressure of the forceps. The nucleus of the calculus was found to be a mass of uric acid about the size of a large pea; upon this the phosphate of lime and the triple phosphate of ammonia and magnesia were deposited in strata.

VII.

STONE IN THE BLADDER, OF LARGE SIZE, FORMED UPON A FOREIGN BODY INTRODUCED INTO THE ORGAN—LITHOTOMY—RECOVERY FROM THE OPERATION—DEATH SUBSEQUENTLY FROM THORACIC DISEASE.*

J. Brinkerhoff, twenty years of age, born in New Jersey, was admitted, July 31st, 1853, into Second Surgical Division, (Dr. Van Buren in attendance.) He is a thin, cadaverous-looking young man, of shy manners, and apparently of a very low grade of intelligence. The history of his case is derived mainly from a letter addressed by his attending physician, Dr. Chas. Hasbrouck, of Schraalenberg, N. J., to Dr. Van Buren, when the patient was committed to his care.

The boy had been complaining in an obscure and unsatisfactory way, for several years past; he was evidently suffering very constantly, and had grown thin; was solitary in his habits, and exceedingly uncommunicative, so that his parents could get no clew to the cause of his complaints, which he attributed in a vague manner to his urinary organs. His sufferings increased, and he had an attack of hæmoptysis; and finally, under the alarm which the latter symptom gave rise to, he confessed that nearly five years before, a lad with whom he was in the habit of playing, pushed a piece of a slate-pencil, about an inch and a half long, into the orifice of his urethra, that it slipped beyond his reach, and he never saw it

* This case is taken, with a few alterations and additions, from the records of the New York Hospital. (From the *New York Medical Times*, No. 7, April, 1854.)

again; but shortly afterward was taken with more frequent desire to urinate than was usual for him, and each effort to pass his water was followed by severe pain and straining. Since that period he had never been free from pain about the bladder, and in passing water; and the consciousness of the foolish cause of his suffering, of which he was no doubt himself the author, made him shy and uncommunicative in regard to it. He confessed also that he had been in the habit of self-abuse, both before the accident detailed above, and also to a much greater degree since; in fact, of late years he seems to have been unable to keep his hands away from his genital organs.

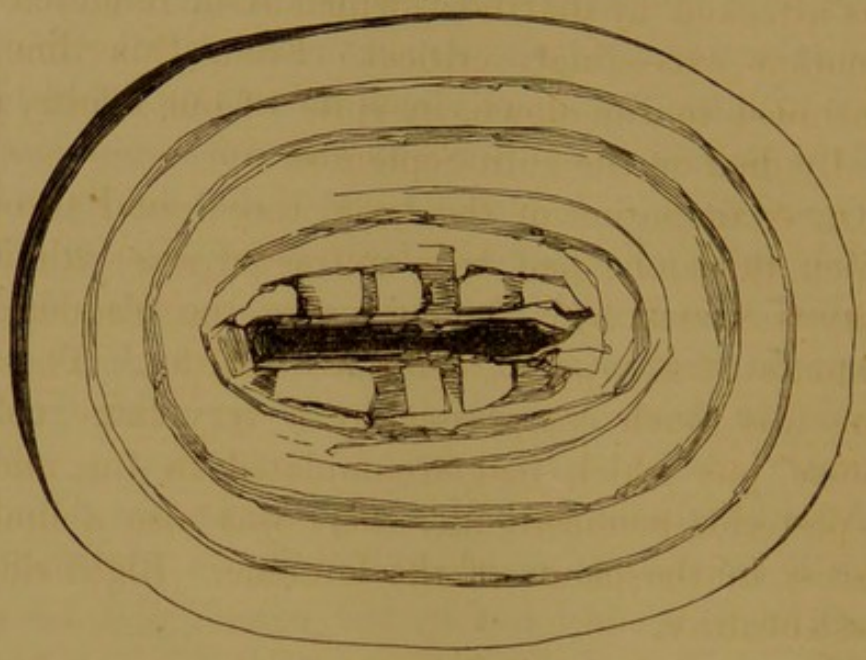
After admission into the hospital, he was found to have a calculus of considerable size in his bladder, which was readily felt by the sound, and he presented all the usual symptoms of the disease. His bladder was in a very good condition. His general health was good, with the exception of a very slight cough, and slight flatness under the left clavicle. Pulse regular, and appetite good.

On consultation, it was determined to give him the chance of the removal of his calculus; and accordingly, on the 6th of August, he was operated upon by Dr. Van Buren, by the lateral method, with the knife. There was no difficulty in withdrawing the calculus, although its dimension exceeded the average size of urinary calculi.

A section was made of the stone while still wet, by M. Luer, and in its center was found the slate-pencil passed into the bladder five years before, thus proving the patient's statement. The adjoining wood-

cut will give an idea of its dimensions. Its weight (apoth.) is 3 oz. 5 dr. 11 grs.; length, $2\frac{3}{4}$ in.; breadth, $2\frac{1}{16}$; thickness, $1\frac{3}{4}$.

Fig. 1.



The bladder was syringed out with tepid water; a bandage passed around the patient's leg; and by the time he was well recovered from the influence of the ether, which was employed during the operation, he was removed to his bed, and an anodyne administered. No perceptible shock was caused by the operation.

The patient did perfectly well until the eighth day after the operation, when he had an attack of pneumonia in the left lung. This limited itself on the eleventh day, and he did well again for a week; but he continued to have unpleasant symptoms, recurring from time to time on the left side of the chest, which rendered his recovery exceedingly slow; and at the end of a month urine was still passing through the wound, although the latter had contracted down to a

mere fistulous tract. He was now also annoyed by a bed-sore over the sacrum, which rendered it necessary to place him upon a water-bed.

Unfortunately, during the fifth week, the patient was attacked by diarrhœa, which soon rendered his situation exceedingly critical. From this time he continued to run down, in spite of our efforts, and finally died on the 16th September.

On examination of the body, the wound through which the stone had been extracted was with difficulty traversed by a slender probe, the bladder and contents of the pelvis being all healthy. The left lung was much compressed by a very large collection of pus which had accumulated in the middle or posterior mediastinum; there was also a limited abscess in the pleura of the left side. Right side of chest healthy.

The case just detailed is not the only one which I have encountered in which a urinary calculus has been formed upon a foreign body introduced into the bladder from without. In one of the present series of cases it will be recollected that the broken end of a catheter became incrusted with urinary salts so as to form a calculus, which was subsequently removed by the lithotrite. (*Med. Times*, vol. ii., No. 8, May, 1853.)

VIII.

About six years ago I operated upon an aged man, in Bellevue Hospital, by lithotomy, for the extraction of a calculus of large size, which was found to have

been formed upon a nucleus which, from its unusual and grotesque character, I suspect to be an unique specimen in the history of urinary calculi. The case was made public at the time in the Proceedings of the N. Y. Pathological Society, published in the *N. Y. Journal of Medicine;* but in consequence of its rare and curious character, I subjoin a wood engraving of the nucleus in the present connection.

Fig. 2.

It is a head of wheaten straw, complete in its proportions, and faithfully represented by the artist, with fragments of the urinary salts (triple phosphates) still incrusted upon it. The calculus, which was of a very friable consistence, was crushed by the forceps while it was being withdrawn from the bladder, and the nucleus alone is represented in the engraving. Its extremity was evidently folded upon itself; and, thus

bent, it is more than two inches in length. From the partial confessions of the patient, I surmise that this strange substance found its way into his bladder in the following manner: he was a pauper, sleeping upon a straw bed, and a very old man. As is not unfrequently the case with aged men of this class, he was in the habit of provoking what remained of his capacity for sexual excitement by such odd means as his fancy suggested; and, with this object no doubt, he one night drew out a straw from his bed-sack, and introduced the end to which the head had been attached into his urethra. The beard and husks upon the straw gave him pain in attempting to withdraw it, and he probably dropped asleep without removing it. The motions of his body during sleep forced the straw onward into the urethra beyond his reach; and ultimately, in consequence of the arrangement of its husks and barbs, it reached his bladder, where, of course, it soon became incrusted with the salts of the urine.

POPLITEAL ANEURISM.*

POPLITEAL ANEURISM SUCCESSFULLY TREATED BY COMPRESSION.

THE following case of aneurism is the second which has been cured by compression in Bellevue Hospital during the past year; the former, which was also a popliteal aneurism, occurred in the service of Dr. J. R. Wood. It is transcribed from the notes taken at the time by Dr. Nash, Assistant House Surgeon.

MARTIN PLUNKETT, a native of New York City, aged thirty-two, was admitted February 25th, 1851. He is of a healthy family, and is himself of good constitution, and for some time past of temperate habits, although formerly in the habit of drinking to excess. Several years ago he had chancre, which was not followed by secondary symptoms, and for which it cannot be ascertained that he took mercury; and two years since he had an attack of pneumonia, for which he was treated in the New York Hospital. He is also perfectly deaf since bathing in cold water, while heated, ten years ago. With these exceptions, he has enjoyed good health. His employment has been that of a boatman on the Erie Canal during the last thirteen seasons. Just previous to the discovery of the tumor, he was engaged loading a sloop with iron at Har-

* From the New York Medical Times, vol. i., No. 2, November, 1851.

lem, and was obliged to lift with all his strength. Three weeks before admission, his attention was first attracted to the tumor in his ham by the pain to which it gave rise; at this time it was about the size of a hen's egg. It grew rapidly, and in two weeks reached its present size, compelling him to abandon his occupation.

He has now a large pulsating tumor in the left popliteal space, which fills it entirely and stretches widely apart the hamstring tendons. The limb at this point measures over nineteen inches in circumference. The pulsations of the tumor are synchronous with those of the heart, and are equally perceptible on all parts of it; they are controlled by pressure applied to the femoral artery at the groin. There is much œdema of the leg, and the superficial veins about the knee are greatly distended.

On the 4th of March *treatment by pressure* was commenced by means of Dupuytren's instrument applied over the femoral artery, above the middle of the thigh, alternated, as often as the pain rendered a change necessary, by the pressure of the fingers of an assistant at the groin. The pressure of the instrument when first applied was very painful; but the patient in a short time became accustomed to it, and bore it throughout the treatment on an average for half an hour at a time. The application of the fingers he could seldom bear more than fifteen minutes at once. During the day he complained little, and was able to occupy himself in reading; at night, however, it was necessary to administer morphine, under the influence of which he slept for half an hour at a time. The pressure was steadily maintained at a de-

gree at which all perceptible pulsation in the tumor was arrested until the 10th of March. Twice during this period all pressure was removed, and the pulsations of the tumor were found to have ceased, once on the second and again on the fourth day,—on which latter occasion, no pressure was applied for seven hours, at the end of which time a slight pulsation could again be detected. On the 10th, the tumor still pulsating, but very slightly, the treatment was necessarily intermitted on account of the admission of a number of acute cases into the wards, which required all the attention of the house surgeon. This interval allowed the parts to recover from the soreness at the points of pressure.

On the 19th March the treatment was recommenced and conducted as before; and on the 22d, the instrument being removed, no pulsation could be detected. It was, however, reapplied and kept pressing lightly for two days longer, without relief by the fingers.

March 31st. No pulsation discoverable; the tumor is harder, though still elastic; the circumference of the limb is reduced to seventeen inches; several small arteries can be detected pulsating around the knee, and one of them crosses the surface of the tumor. The patient can also extend his leg to a greater degree, and the œdema of the foot and leg has disappeared.

The tumor continued to diminish and grow harder, and at the end of a month, when he was discharged, he could walk with ease; the knee at this time measured less than fifteen inches in circumference.

The patient was seen several months afterward by

Dr. John Moore, the house surgeon of the hospital, to whose persevering attention his cure was mainly owing. He was then perfectly well, engaged in his usual laborious employment, and highly pleased with the result of his treatment.

During the application of the compression in this case there was no observable increase in the œdema of the foot and leg, which is to be attributed to the opportunities afforded to the veins of the limb to empty themselves during the alternations of the pressure from the thigh to the groin. There was, however, a harder swelling of the tissues on the dorsum of the foot, accompanied by redness of the skin and considerable pain, especially on pressure; this followed the use of the compressor on both occasions, and subsided from two to three days after its removal. The exact cause of this condition of the parts I was unable to explain.

CASES

OF

DISLOCATION OF THE FEMUR

TREATED AT THE NEW YORK HOSPITAL.*

THERE is no class of surgical injuries in which the introduction into general use of anæsthetic agents has been followed by greater benefit than in the diagnosis and treatment of dislocations.

Muscular resistance, the most powerful obstacle to the reduction of most recently dislocated bones, can be temporarily annihilated by the influence of sulphuric ether or chloroform, and therefore the remedies formerly resorted to for the purpose of diminishing muscular action, such as bleeding, the warm bath, tartar emetic, and tobacco, are now rarely, if ever, employed. Thus, in addition to the great advantage of saving the patient from pain, the operation upon his luxated hip or shoulder is wonderfully facilitated by the temporary extinction of voluntary muscular action which follows the administration of these agents; so that a double advantage is derived from their use. The entire muscular relaxation and insensibility to pain, which he can produce at will, enables

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* From the New York Medical Times, vol. v., No. 4, January, 1856.

the surgeon to examine the injured limb with more freedom and satisfaction than where every touch or movement of the part is liable to be followed by outcry and resistance; and here again we enjoy an advantage in the diagnosis as well as in the treatment of a dislocation.

My experience in the use of anæsthetics in this class of injuries has convinced me that, in order to secure the full amount of assistance they are capable of rendering, it is necessary to administer the chloroform or ether to such an extent as to insure *profound* insensibility and *entire* muscular relaxation; when not carried to this point, irregular muscular contractions still continue, and may interfere with the success of the necessary manipulations. When muscular action is thus entirely abolished, the anatomical knowledge of the surgeon will enable him very often, by *direct manipulation*, to restore the dislocated bone to its natural position, and with a trifling amount of force. An attempt to reduce a recent dislocation by direct manipulation should be, therefore, as a general rule, the first manœuvre employed by the surgeon after inducing profound anæsthesia; and it is only after the failure of this simple and natural effort that more complicated means become necessary.

In the two following cases of dislocation at the hip, the readiness with which reduction was effected is evidently attributable in a great measure to the influence of the ether. The third case presents complications and peculiarities which induce me to place it on record.

I.

DISLOCATION OF FEMUR INTO FORAMEN OVALE—REDUCTION, DURING PROFOUND ETHERIZATION, BY DIRECT MANIPULATION.

MARTIN WEST, a healthy German sailor, thirty-four years of age, was working in the hold of a ship, on the 23d of July, when he was struck by a bale of cotton weighing four hundred pounds, which fell through the hatchway upon him, a distance of some ten feet. The cotton bale struck him first upon the right shoulder and then upon the outer side of the upper part of the thigh, knocking him down and falling upon him. He was brought immediately to the New York Hospital. On examination, about an hour and a half after admission, the following appearances presented themselves: While lying upon his back in bed, the right thigh is slightly flexed and very strongly abducted; it cannot be approximated to the median line or brought in contact with its fellow of the opposite side. On measurement from the antero-superior spinous process of the ilium to the lower margin of the patella, an elongation of three-quarters of an inch is recognized. Viewed from behind, the right buttock is considerably elongated and narrowed, and the transverse depression between buttock and thigh obliterated. The prominence of the great trochanter has disappeared, but it can be felt on a line parallel with the tuberosity of the ischium, and very far back. On examination in the erect position, the trunk is slightly flexed anteriorly and to the right side, and the lower end of the right femur distant about fourteen inches from its fellow of the opposite

side, and slightly in advance of it, with the foot everted. At the upper and outer part of the thigh there is a marked concavity; the limb cannot be moved without great pain to the patient, and its rotation is very limited. At the upper and inner part of the thigh there is decided unnatural convexity.

About two hours and a half after admission, the patient was conveyed to the operating theater and thoroughly etherized, when, on attempting rotation of the thigh, the head of the bone could be recognized as occupying the foramen ovale. While an assistant was rotating the thigh in a slightly flexed position, with the leg flexed upon it, strong pressure was made over the head of the bone directly outward by the hands placed upon the convexity at its upper and inner portion; and the patient being profoundly under the influence of ether, the head of the bone was felt to move outward, and the movements of rotation and the direct pressure outward being forcibly continued, the head of the bone was felt to glide into its socket with a palpable and audible snap. The deformity at the same moment disappeared, the thigh could be readily approximated to its fellow, and all the natural movements of the joint were restored. The patient's thighs were bound together by a bandage, and he was reconveyed to his bed.

On the next day the patient complained of slight pain about the hip, but the parts presented a perfectly natural appearance; on the 31st of July he was discharged perfectly well.

II.

DISLOCATION OF THE LEFT FEMUR INTO THE ISCHIATIC NOTCH—REDUCTION, UNDER THE INFLUENCE OF ETHER, BY REID'S METHOD.

On the 28th of July, 1855, Daniel Donohue, a moderately healthy Irish laborer, forty-two years of age, was standing in the hold of a cotton ship and assisting in discharging her cargo, when a bale of cotton, which had been imperfectly balanced upon the margin of the hatchway, fell back into the hold upon him. He was struck by it upon the shoulders in such a manner as to flex the trunk forcibly forward, and to prostrate him; he was unable to rise, and was immediately brought to the New York Hospital. When examined in bed, shortly after admission, he was unable to move his left limb, which, on measurement, was found to be shortened three-quarters of an inch. The thigh was slightly flexed and strongly adducted, so as to overlie the knee of the opposite limb, the foot being inverted so as to rest upon the instep of its fellow. The anterior curvature of the lumbar portion of the spinal column was decidedly increased, and, on attempting rotation of the thigh, the head of the bone could be distinctly felt beneath the gluteus maximus muscle, and occupying the ischiatic notch. The foot could not be everted without great pain; and, as he lay, the knee was raised some six inches from the surface of the bed, and could not be brought in contact with it without causing complaint. The patient was conveyed to the operating theater and profoundly etherized, when reduction was attempted by the following manipulation: The leg of

the dislocated limb was flexed upon the thigh, and the thigh itself slowly and forcibly adducted and flexed upon the trunk, until its anterior surface was brought in contact with the abdomen, the knee being in contact with the margin of the ribs in the right hypochondrium. Meanwhile, by means of the leverage afforded by the leg, the thigh-bone was being constantly rotated upon its axis. While the thigh was thus in a position of forced flexion and adduction, it was slowly and gradually abducted, the knee sweeping across the front of the abdomen until it was brought beyond the left side of the trunk into a position of forced flexion and abduction, the rotatory or rocking motion of the femur being still continued. From this position of forced flexion, combined with abduction, the thigh was gradually extended, forcible abduction being still kept up, when, the knee being about on a line with the symphysis pubis, an audible shock was both felt and heard, which marked the return of the femur to the acetabulum.

The limb was then fully extended, and all symptoms of dislocation were found to have disappeared.

The two limbs were bandaged together and the patient conveyed to his bed. He recovered without any untoward symptoms, and on the 20th of August was discharged cured.

III.

FRACTURE OF BOTH BONES OF LEG AND OF TARSAL BONES OF LEFT LIMB—DISLOCATION OF RIGHT FEMUR VERY FAR BACK IN THE ISCHIATIC NOTCH, WITH UNUSUAL FEATURES—REID'S METHOD TRIED WITHOUT SUCCESS—REDUCTION EFFECTED BY THE COMPOUND PULLEYS.

PATRICK DOOLEY, a robust Irish laborer, twenty-one years of age, received the above injuries by the running off the track of a train of railroad cars on the 23d August, 1855. He was brought to the New York Hospital about two hours after the accident, and reaction being already well established, the fractured limb was put up temporarily in carved splints, and the patient placed under the influence of sulphuric ether, in order that the dislocation might be thoroughly examined and its reduction attempted.

The attitude of the dislocated limb was the same after as before etherization. It was shortened about an inch; the foot and leg were slightly *everted*. This eversion, it was afterward ascertained, could be readily increased by manipulation; but there was an evident obstacle at the hip to *inversion* of the foot. The knee was slightly flexed, so that the width of the hand could be readily passed between its popliteal aspect and the surface of the bed. The obliquity of the femur toward its fellow was very slightly increased. Upon the front of the thigh at its upper third, a very manifest concavity or sinking in was noticeable, the usual anterior convexity of the limb being lost. The trochanter was about an inch and a half behind and above its usual position, and, during etherization, it was quite movable on attempting rotation of the limb.

Finally, the head of the femur could be felt obscurely but pretty certainly rotating in the ischiatic notch, low down, and in contact with its posterior margin. The anterior convexity of the spine at the loins was also very much increased, so that under ether more than the width of the hand could be passed between it and the surface of the bed.

Thus the case presented all the classical features of luxation into the ischiatic notch, and more than usually well marked, with the exception of adduction of the lower end of the femur and inversion of the foot.

Reduction by Reid's method was now attempted by my colleague, Dr. Halsted, and myself, but without success; the manœuvre was repeated systematically, carefully, and perseveringly, at least seven or eight times. The head of the bone would always apparently approximate the brim of the acetabulum during abduction; but when the limb was carried downward into the extended position, it could be sensibly felt slipping back again into its false bed. These movements of the head of the femur were always associated with a sensation of albuminous crepitus; there was a great deal of this, and it very closely resembled the crepitus of broken bone.

We next proceeded to apply the pulleys, and made extension, as usual, in the direction assumed by the luxated bone. When the head of the bone had been drawn downward and forward, considerably beyond the acetabulum, as was evident from the position of the great trochanter, and after the limb had been rotated as freely as possible while thus forcibly extended, the hands were applied behind the head and trochanter to oppose their return to the notch, and

the extending cord was suddenly cut, but the head of the bone was not reduced.

Drs. Cheesman and Buck, who had meanwhile arrived at the hospital in attendance upon another case, now joined the consultation, and recognized the features of the case as I have stated them. At their suggestion the patient was placed upon his side—the side opposite to the dislocation—and the pulleys again applied to the thigh in a flexed position; extension was thus made in a direction at right angles to the pelvis, and counter-extension effected by means of a sheet applied around the pelvis and pulled in the opposite direction. It was thought that this manœuvre might be more successful, as the head of the bone lay so far back in the ischiatic notch it would now be dragged more directly forward into the acetabulum. Appropriate manipulation was made use of during extension; and when the cord was cut, the limb being suddenly abducted and extended, we had the gratification of recognizing, by the restoration of its natural shape and length, that the dislocation was reduced.

In consequence of the mobility of the head of the bone and the probable amount of laceration of soft parts around the joint, it was thought advisable to apply the long outside straight splint of a fracture apparatus, and to bandage the limb and pelvis to it, a large pad being at the same time placed behind the trochanter.

At the next day's visit the patient was found free from pain, with a quiet pulse, and both limbs doing well.

On September 3d (the twelfth day) the long splint was removed, the hip found free from pain and in-

flammation, and the joint capable of its natural motions, with but a trifling amount of stiffness. The patient recovered well from the fracture of his left leg, and was discharged cured on the 23d October, with perfect use of both limbs.

I should be disposed to attribute the absence of the usual amount of adduction of the limb and inversion of the foot, in this case of dislocation, to the probable laceration, to a greater or less degree, of the *gluteus medius*, *gluteus minimus* and *obturator externus muscles*, or their tendons. The great trochanter not being drawn forward and kept in contact with the dorsum ilii, as it usually is in the backward dislocations of the femur by the tension of these muscles, was carried outward and backward by the weight of the limb into a moderate degree of external rotation.

This laceration of muscles is rendered more probable by the distance—greater than usual, and the direction almost horizontally backward—of the head of the bone from the acetabulum.

The rapid and entire recovery from these injuries is no doubt mainly owing to their subcutaneous character.

It is also worthy of remark in this case, that the patient was under the influence of ether more than three hours without any observable ill effects.

CASES

OF

STRANGULATED HERNIA OF THE TUNICA VAGINALIS (CONGENITAL HERNIA)

OCCURRING IN THE ADULT. WITH REMARKS.*

I AM induced to record the following cases, both on account of the individual interest which they possess, and also because they illustrate certain features of an interesting and important variety of hernia, which do not seem to have received from practical surgeons as much attention as they deserve.

It is the general belief among surgeons that a case of strangulated inguinal hernia requires the same treatment at their hands when the rupture has formed a peritoneal sac for itself in its descent, in the usual mode, as well as in those rarer cases where the protrusion occurs through an unobliterated communication between the peritoneum and tunica vaginalis testis, and occupies the latter cavity. In operating for strangulated hernia upon the adult, it is also assumed, almost as a matter of course, that the sac of the hernia has been formed by itself in its descent, and that it has no connection with the tunica vaginalis.

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* From the New York Medical Times, vol. v., May, 1856.

Influenced by these impressions, I own that I have been surprised to see the testicle so often brought in view when the sac of an inguinal hernia has been laid open, and perhaps the more so, as the congenital character of the rupture has not been generally anticipated. In reviewing the following cases, I think that certain features will be recognized as peculiar to hernia of the tunica vaginalis, and dependent upon the mechanism of its formation, by which it may be distinguished from the more common variety of inguinal rupture. And if, owing to the peculiar mechanism of this species of hernia, the stricture by which it is strangulated is always seated at the neck of its sac, as in all the cases which follow, it then becomes a matter of practical importance that it should be recognized before operating; because any operation for its relief which does not include the opening of the sac and division of its neck will be obviously improper. Mr. Luke's case, quoted at the close of this paper, would seem to confirm this assertion.

It is hardly necessary to remark that the term "congenital," originally applied to hernia of the tunica vaginalis by Haller, is not only incorrect, but singularly unfortunate, as its very general employment serves to perpetuate erroneous ideas in relation to the disease.

In every one of the cases which I am about to relate, the rupture made its first appearance at a period more or less removed from birth.

I.

STRANGULATED HERNIA OF TUNICA VAGINALIS—OPERATION—STRICTURE IN NECK OF SAC OPPOSITE INTERNAL RING—FLUID IN SAC IN UNUSUAL QUANTITY—INFLAMMATION OF SAC AND CONTENTS—RECOVERY.

JOHN ANDERSON, mate of a coasting vessel, thirty years of age, was admitted to the New York Hospital on the 23d of September, 1853, under my care, with symptoms of strangulated inguinal hernia. He had never been ruptured until about two weeks before, when a tumor suddenly appeared in the right groin while he was making severe exertion.

A truss was applied to it; but, going to sea after a few days, the truss broke, and he was obliged to return the hernia as well as he could when it came down. About five days before admission, after exposure to wet and cold, he began to feel some pain in the tumor, which extended over the abdomen, and was accompanied by occasional vomiting. The belly became tense and tender, and from this time he had no passage from the bowels. The scrotum also was noticed to be gradually swelling, and he was unable to put back the rupture as before. On examination, the hernial tumor was found to be small, and it could be pushed inside of the external ring, but no farther, giving the idea that the sac and its contents were merely pushed into the inguinal canal without being properly reduced. On handling the tumor, a peculiar creaking sensation was noticed, such as would be produced by the friction together of two inflamed and dry serous surfaces. The scrotal tumor was evidently a collection of fluid in the sac—which was suspected to

be the tunica vaginalis. Pulse 60; skin natural. Food and drink rejected as soon as swallowed. Much purgative medicine had been administered before he entered the hospital, and also anodynes, and tobacco enemata, but without relief.

The taxis being only partially successful, was not persisted in, lest the hernia might be reduced "en bloc." The symptoms of obstruction rather than strangulation seeming to call for the operation, it was accordingly performed, after consultation, about seven o'clock P.M., on the day of his admission. On opening the sac, it was found to contain a knuckle of small intestine, lying in contact with the testicle; the sac contained also about two ounces of serum. It was found necessary to lay open the inguinal canal in order to get at the stricture, which was formed by the constricted neck of the sac, at the internal ring. The intestine was not very dark in color, but was evidently inflamed, as well as the sac; a delicate and somewhat rough layer of false membrane could be detached from both serous surfaces, thus explaining the creaking sensation mentioned above. After incision of the stricture, the gut was readily returned; and after its reduction, a quantity of clear serum flowed out of the peritoneal cavity. The patient's urgent symptoms were all relieved after the operation, and during the night his bowels acted freely, and the abdominal distention disappeared. Nevertheless, inflammatory symptoms persisted, and general peritonitis was seriously threatened, if indeed it did not really exist. Opium was employed very freely and steadily, and by its use evidently the symptoms were controlled; and at the end of ten

days the patient was convalescent; and on the 28th of October he was discharged cured.

II.

STRANGULATED HERNIA OF TUNICA VAGINALIS, OF LARGE SIZE—UNUSUAL QUANTITY OF FLUID IN THE SAC, RECOGNIZED BEFORE OPERATION—STRICTURE AT NECK OF SAC.

On the 27th of March, 1855, an intemperate German, of forty-two years of age, was admitted to the New York Hospital, under Dr. Halsted, with strangulated scrotal hernia of the right side. His symptoms were vomiting, prostration, cold skin, feeble pulse, and hiccough. The scrotal tumor was very large, and excessively distended. It was learned from the patient that he had been ruptured for some years, and had worn a truss, which he had left off recently while on a drinking bout. Symptoms of strangulation had come on about ten hours before his admission to the hospital, after a debauch. On examining the tumor by transmitted light, translucency could be distinctly recognized. After full etherization, the taxis was employed unsuccessfully, and the operation performed. On incision of the sac, about half a pint of fluid resembling that of hydrocele escaped, and about four or five feet of dark-colored intestine were found in the tunica vaginalis. The stricture was divided, and the gut returned. The patient died in about forty-eight hours, exhausted, with low muttering delirium.

No post-mortem examination could be obtained.

The prominent features in this case were the sudden increase of a rupture already existing, causing excessive distention of the scrotum, and an unusual amount of pain, which seemed to be in great part owing to the stretching of the scrotal integuments; the presence of a large quantity of fluid in the tunica vaginalis, together with no less than five feet of gut; and finally, the situation of the stricture in the neck of the sac, high up in the inguinal canal.

III.

STRANGULATED HERNIA OF THE TUNICA VAGINALIS—THE LATTER FOUND TO BE PARTIALLY OBLITERATED—STRICTURE AT NECK OF SAC.

Rich. Pendergrast, aged nineteen, was admitted to the New York Hospital, May 17, 1855, under Dr. Markoe, with strangulated inguinal hernia of the right side. It had shown itself suddenly on the morning of the day previous, without his being able to attribute it to any unusual strain or effort. He had never had hernia before.

There was found, on admission, in the upper part of the scrotum, a small, hard tumor emerging from the external abdominal ring. He had a good deal of colicky pain, with occasional vomiting, and disgust for food. These symptoms had come on soon after the appearance of the tumor. His general health, condition, and habits were good. Without any difficulty the scrotal tumor was reduced by the house surgeon, and the symptoms for the time were re-

lieved. The next morning, however, some pain at umbilicus, with nausea and vomiting, again occurred, with hiccoughs, and the next day the belly became painful and tumid. Cups were applied by the house surgeon, and a dose of oil given, which was said to have operated. On the 21st, he was first seen by Dr. Markoe. He was then suffering under all the above described symptoms of intestinal obstruction, which, though constant, were occasionally relieved by free vomiting. No tumor could be found in the scrotum; but just about opposite the internal abdominal ring, a small swelling was indistinctly perceived, deep under the integument, as if it occupied the inguinal canal. This swelling was slightly tender to the touch. Regarding the case as one of hernia strangulated and reduced *en masse*, the operation was immediately performed. The inguinal canal was carefully laid open, and in it was found a hernial sac, containing a knuckle of small intestine of fair color and appearance. The stricture was evidently seen to be at the neck of the sac, which, when divided, allowed the protruded gut to be easily reduced. All the symptoms were entirely relieved by the operation; but on the evening of the second day, the evidences of peritonitis showed themselves. The inflammation increased rapidly, and terminated his life on the 23d, about forty-eight hours after the operation.

On making a careful examination of the parts after death, we found, beginning at the peritoneum, a small rounded opening leading from the general cavity down into the sac from which the hernia had been reduced. This sac lay above and to the inner side of the cord,

to which it was closely attached. It was about three inches long, and narrow like the finger of a glove, reaching down to within an inch of the testicle. This sac presented on its anterior face the incision made in the operation, which incision was just below the abdominal opening of the sac. Just below this incision, the caliber of the sac became contracted and then expanded, so as to form a pouch at its lowest portion. Separating this lowest pouch of the hernial sac from the testicle, was another elongated sac, an inch in length, which reached down to the testicle. This lowest sac contained a little reddish serum. It neither communicated with the empty hernial sac above, nor with the tunica vaginalis below, but was shut off from either by a thin membrane. It seemed clear that this elongated sac was the tunica vaginalis, which was obliterated only at two points, one just at the testis, and the other one inch above. The lower segment was a hydrocele of the cord, the upper segment was the sac of a congenital hernia.

IV.

STRANGULATED HERNIA VAGINALIS—SIMULTANEOUS OCCURRENCE OF RUPTURE AND STRANGULATION, IN THE ADULT, WITH GREAT DISTENTION OF SCROTUM—OPERATION—RECOVERY.

Wm. Dennom, a Pennsylvanian, twenty years of age, driver of an express wagon, ruptured himself about the commencement of the year 1855, before which time he had been entirely free from any trouble of the kind. In a day or two, however, the rupture

disappeared spontaneously, without any care or treatment, and he remained free from disease until the 5th of July following, when, on jumping from his wagon, the rupture suddenly came down to a very considerable extent, distending the scrotum on the left side, apparently to its utmost capacity. He entered the New York Hospital (under the care of Dr. Halsted) about three hours after the accident, suffering excessive pain, unable to stand upright, with a cold, clammy skin, and a feeble pulse. The tumor of the scrotum was globular or somewhat pyriform in shape, excessively tense and painful to the touch, and it received no impulse on coughing. The patient was constantly nauseated, his teeth were chattering, and he was urgent for relief; his whole condition was that of a person suffering prostration from sudden injury.

Warm bath, taxis, and subsequently the application of cold to the tumor were employed without any result; when, at eight o'clock P.M., after consultation, the patient was fully etherized, and, the taxis having been again tried unsuccessfully, the operation was performed by Dr. Halsted. On opening the sac, it was found to contain, as was computed at the time, about sixteen or seventeen inches of small intestine, of a very dark color, and the testicle in its usual position behind the gut. The stricture was seated at the neck of the sac, and after its division the gut was successfully returned. The wound was closed as usual, and a compress and bandage applied. The patient made a good recovery, and, after having been fitted with a suitable truss, was discharged cured, on the 10th of August following.

V.

STRANGULATED HERNIA OF TUNICA VAGINALIS—CENTRAL HOUR-GLASS CONTRACTION OF SAC—STRICTURE AT NECK OF SAC OPPOSITE INTERNAL RING—OPERATION—RECOVERY.

On the 17th October, 1855, I was requested by Dr. Nordquist, of Rivington Street, to see with him a healthy German, thirty-five years of age, who had been suffering since mid-day with symptoms of strangulated hernia. He had been ruptured since early boyhood, but had never worn a truss. I found him, at ten o'clock P.M., suffering severe pain in his left groin and belly, and with occasional vomiting; his pulse was about 80, and feeble, and his hands clammy and cold. An elongated tumor, of the shape and size of a Bologna sausage, occupied the scrotum on its left side, and extended upward, curving slightly outward to the position of the internal abdominal ring, where it terminated somewhat abruptly. The tumor was very tense and hard, nowhere sonorous on percussion, receiving no perceptible impulse when the patient coughed; and it was much narrower at its middle than above or below. No medicine had been administered, and but very slight efforts attempted at reduction. The bowels had not been relieved since the day before, when he had, as usual, a healthy stool.

As soon as the patient's consent could be obtained, he was put under the influence of chloroform, and the taxis employed, but without the slightest effect upon the tumor. The operation was then immediately performed, and about eight inches of small intestine were found, presenting a dark, congested appearance,

and completely enveloped by omentum, which was thickened and harder than natural, and which formed four-fifths of the contents of the sac. The stricture, which was apparently at the neck of the sac, required free division both at the external and at the internal rings before the protruded mass could be reduced; and it was also necessary to divide the constriction at the middle of the sac, which embraced its contents as tightly as if a silk ligature had been tied closely around the mass. After this central constriction had been divided, and the omentum withdrawn from the inferior cavity of the sac, the testicle was seen occupying it. The wound was closed with straps and sutures, and a compress and bandage applied.

The patient passed from under the care of Dr. Nordquist and myself; and I did not see him again, after the operation, until the 13th of the present month, when he was brought to me, at my request, in perfectly good health, but with a protrusion almost as large as at the time of the operation, reducible, but imperfectly kept up by a badly-fitting truss. His recovery after the operation had been rapid and uninterrupted.

VI.

STRANGULATED HERNIA OF TUNICA VAGINALIS — SIMULTANEOUS OCCURRENCE OF RUPTURE AND STRANGULATION—GREAT DISTENTION OF SCROTUM—STRICTURE AT INTERNAL RING—OPERATION —RECOVERY.

Augustus Colburn, a butcher's boy, eighteen years of age, was brought to the New York Hospital, about two o'clock P.M., on the 16th February, 1856, by a

policeman, who had found him sitting on the sidewalk, suffering great pain, and scarcely able to walk. He referred his pain to the scrotum, which was found to be very much distended, but of its natural color, and the swelling extended up through the inguinal canal of the right side to the middle of Poupart's ligament, just above which, over the situation of the internal abdominal ring, it terminated, presenting a pyriform shape, and the size of a large orange. The boy was pale, chilly, depressed, with a pulse of 80, unable to stand upright in consequence of the increased pain in the groin experienced in this position, and constantly sick at his stomach. On being questioned, he stated that he had a rupture on the right side some five years before, which had gone away of itself in a few days, and never returned; and that he had no swelling in the groin until about ten o'clock of the morning of his admission, when, while lifting some heavy baskets of meat upon his cart, the present tumor had suddenly made its appearance, and attained its full size at once, causing immediate and severe pain, accompanied by nausea.

Immediately on his admission, the patient had been placed in a warm bath by the house surgeon, and some efforts made to reduce what was at once recognized as a strangulated inguinal hernia. I saw him very shortly afterward; and in consultation with my colleague, Dr. Markoe, we concluded that as the descent into the scrotum had taken place so suddenly, it was probably a hernia into the tunica vaginalis; and that, in consequence of the great tension of the scrotum and evident tightness of the stricture in the inguinal canal, very little was to be

hoped from taxis, and that no time should be lost in giving relief. The patient was accordingly etherized at once, and as we could make no impression upon the tumor, he was at once conveyed to the operating theater, about three o'clock P.M. On opening the sac, the testis was found as was anticipated, and also about ten inches of small intestine, intensely congested, and embraced very tightly by the borders of the external ring. After this source of constriction had been relieved by incision, the gut was found still to be irreducible from stricture *evidently* situated higher up in the inguinal canal. By enlarging the incision already made in the tendon of the external oblique, in such a manner as to expose the interior of the canal, and by making gentle traction upon the sac and intestine, I succeeded in bringing into view the internal ring, encircling the neck of the sac and its contents as tightly as I have ever seen a femoral hernia strangulated. The neck of the sac and this tight ring surrounding it were then incised, in effecting which not a little care was required; and the bowel could then be drawn down and examined, and afterward readily returned into its proper cavity. The patient recovered without a bad symptom, and was fitted with a truss, and discharged cured in about three weeks.

VII.

STRANGULATED HERNIA OF TUNICA VAGINALIS—CENTRAL HOUR-GLASS CONSTRICTION OF SAC—STRICTURE IN SAC AT INTERNAL RING—OPERATION—RECOVERY.

P. C., an undersized man of fifty, of good constitution and steady habits, was taken with symptoms of strangulated hernia on Saturday, March 22, 1856, at about eight o'clock P.M. He had been ruptured when a boy, in a tussle, and had never worn a truss except for a few months after the first occurrence. The rupture was always down, filling the scrotum to the size of a large hen's egg, except at night, when it returned spontaneously. On the evening in question, he had been exerting himself rather more than usual, and the rupture came down in greater volume than ever before; giving him gradually more and more uneasiness, until about eight o'clock, when he felt sick at the stomach, and retired to his bedroom for the purpose of putting it up; but found that, for the first time in his life, he was unable to make any impression upon it. Pain, nausea, and vomiting continued all night. He was seen early in the morning, by Dr. J. R. Leaming, at whose request I saw him at eleven o'clock A.M.

I found an exceedingly tense, elongated tumor, extending from the situation of the internal abdominal ring of the left side to the bottom of the scrotum. It was about eight inches in length, dull on percussion, hard and slightly doughy to the feel, and presented an obvious constriction at its middle, *i.e.* about six and a half inches below the external ring. It re-

ceived no impulse when the patient coughed. The patient's pulse was 60, his surface cooler than natural, his pain constant and severe at the groin, and extending to the small of the back, and the nausea and vomiting urgent. His bowels had not acted for several days; he had taken no medicine; and, owing to the excessive tenseness and tenderness of the tumor, but very moderate taxis had been employed.

With his entire consent, he was placed fully under the influence of sulphuric ether, and one fair effort at reduction having failed to make any impression upon the tumor, the operation was performed at once. The sac was opened throughout the greater part of its length, the constricted portion requiring careful division by the curved bistoury upon a director. A large cylindrical mass of omentum presented itself, deeply indented by the constriction of the sac; and, entirely enveloped by the omentum, a knuckle of small intestine was unfolded, presenting a dark port-wine color. The sac contained no fluid. On withdrawing the omentum from the lower of the two cavities into which the sac was divided by its central constriction, the testicle was brought in view, lying at its posterior part. The omentum was adherent to the sac at its constricted portion, whence it was separated by the handle of the scalpel; and also around the proper neck of the sac, from which it was also detached, with very slight bleeding. After dividing the stricture at the external ring, a second very tight stricture was found to exist at the internal ring, which required incision before reduction could be effected. Both of these strictures seemed to me to be in the sac itself. The intestine was drawn down, and found

to be uninjured where it had been constricted; and with the omentum, although this was somewhat thickened, was replaced entirely within the abdominal cavity, the finger following it to its full length. No ligatures were required. The wound was closed by sutures, and moderate and careful pressure applied by means of a soft compress and a spica bandage. Opium was advised if the pulse should rise; it did not exceed 100, however, at any time after the operation. He had no recurrence of pain or vomiting. The bowels did not act until the fifth day, when a moderate dose of oil brought away a free passage. On the same evening the wound was examined for the first time, and found to be entirely united by the first intention. The sutures were removed, and no subsequent dressing required. On the tenth day, the condition of the parts was so entirely natural as to justify the application of a truss, which caused no complaint, and has been worn satisfactorily ever since. This is the earliest period after the operation for strangulated hernia that I have been able to apply a truss.

The constriction at the middle of the sac, which formed so prominent a feature in this case, giving it the shape of an hour-glass, seemed to me to mark the point where nature had attempted, unsuccessfully, to obliterate the communication between the tunica vaginalis proper and the tubular prolongation connecting it with the peritoneal cavity.

Remarks.—The most striking feature in the preceding cases is the frequent occurrence of distention of the inguinal canal by the hernia, and the necessity

of dividing the neck of the sac at the internal ring before relieving the stricture. In connection with this fact, is to be noticed the central constriction of the sac in two cases, (V. and VII.) I suspect, from frequent examination of the parts in the dead body, that the process of peritoneum connecting its cavity with the tunica vaginalis testis remains unobliterated more frequently than is generally supposed; and that the effort at obliteration is more marked *at the internal ring*, and *just above the testis*, (Case III.;) and that this circumstance explains the frequency of stricture at the internal ring, as well as the constriction observed at or below the middle of the sac.

The hour-glass shape, often observed in cases of hydrocele, is similarly explained; and the general resemblance in shape between hydrocele and hernia of the tunica vaginalis is a point of interest in connection with the diagnosis of the latter. In the same connection, the mode of formation of encysted hydrocele of the cord is illustrated by the condition of the parts observed in the dissection of Case III.

The sudden occurrence of a rupture, descending at once into the scrotum, (as in Cases IV. and VI.,) has already been recognized as a characteristic feature of hernia of the tunica vaginalis; and to this might be added liability to excessive distention of the scrotum and inguinal canal, with simultaneous strangulation at the neck of the sac, (which generally corresponds with the internal abdominal ring,) accompanied by symptoms of sudden shock to the system, severe local pain, and inability to assume the upright position. In fact, the combination of these symptoms, when occurring in a young adult, as in the cases above

cited, could hardly fail to justify the diagnosis of a hernia of the tunica vaginalis.

The existence of fluid contained in a cavity in the scrotum, in conjunction with symptoms of strangulation, (as in Cases I. and II.,) is too obviously characteristic of the form of hernia under consideration to require further remark.

In confirmation of the principal practical point which I conceive to be deducible from the cases here recorded, viz., the necessity for laying open the sac in strangulated hernia of the tunica vaginalis, when it can be recognized, I will add, in conclusion, an interesting case operated on by the late Mr. Luke, at the London Hospital, and recorded in the *London Medical Gazette*, vol. ix. p. 102. The patient, twenty-four years of age, was brought to the hospital on the 7th of July, 1831, with a large scrotal rupture, which had appeared for the first time two hours before, from an exertion in raising a large plank. The tumor was large, tense, and extremely painful; the countenance anxious; there was pain in the abdomen, with rejection of everything taken into the stomach. The taxis and warm bath having been tried without success, the operation was performed without loss of time. Mr. Luke made an incision of about four inches, in the direction of the inguinal canal, and extending to the upper part of the tumor; and then carefully cut down to the neck of the sac, which the tendon of the external oblique was distinctly observed tightly girting, so that it was impossible to introduce a director between them; the stricture was therefore divided from without, by means of the point of a scalpel, and then, without opening the sac, the intestines were returned

into the abdomen, on which the man expressed himself immediately relieved. Bleeding, leeches, and other means were necessary; and the wound had nearly closed on the 26th of August, when he became unwell; on the following day sickness came on, and the hernia descended. The symptoms of strangulation, which were urgent, could not be removed, and the operation was repeated. It was now necessary to open the sac, which contained eight or ten inches of dark-colored intestine. The patient died in a fortnight—*and it was then found that the rupture had been congenital.*

LIGATURE OF THE SUBCLAVIAN ARTERY.

CASE OF LIGATURE OF THE SUBCLAVIAN ARTERY. WITH STATISTICAL DATA.*

THE case which I am about to relate possesses neither novelty nor extraordinary interest, and I do not know but that I should apologize to the Society for obtruding it upon the attention of its members. It is a case of rapidly increasing false aneurism, extending from the arm into the axilla, resulting from a knife-wound, in which it was deemed necessary to apply a ligature to the subclavian artery above the clavicle, the operation having had the immediate effect of arresting the progress of the disease, and of thus ultimately saving the life of the patient.

The ligature of the subclavian artery, in the most external part of its course, has ceased to be a very rare surgical operation; but it is not one of the least successful of that brilliant series of operations upon the great arteries, the introduction of which, toward the close of the last, and in the earlier part of the present century, has added so much to the resources of modern surgery. And as yet this operation has not become so common but that cases occur, not unfrequently, in which, for the want of such interference,

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* From the Transactions of the Medical Society of the State of New York. (Read at the semi-annual meeting of the Society, July, 1852.)

life is in danger of being sacrificed; and the multiplication of recorded instances tending to establish its true value, and to illustrate the nature of the cases of disease or injury to whose cure it is applicable, is calculated I conceive to add to the resources of the physician, and thus to benefit humanity.

Instances of disease or injury requiring the ligature of the subclavian, or any other large arterial trunk, occur but rarely even to those of the profession who enjoy the most extended scope of observation, and an individual has not therefore an opportunity of acquiring sufficient personal experience to enable him to speak positively as to the amount of risk and the prospect of benefit, etc. which belong to the operation,—questions which patients and their friends have a right to ask and to which it is desirable that answers should be furnished when the facts are at hand to supply them. These facts are only to be gathered from a careful study of the recorded experience of others; and with this object I have collected together the heads of a large number of cases on which ligature of the subclavian artery has been performed, and a slight abstract of these, bearing upon certain points of interest connected with the operation, I propose to add to the account of the case which I am about to report, hoping that such data may not prove uninteresting, at least for reference, to those of the Society particularly interested in surgery, and that their general results may be acceptable to all.

I am aware that tabulated abstracts of the operations upon most of the large arteries, with a view to statistical results, are already before the profession, and the excellent tables prepared by Dr. Norris, of

Philadelphia, on this particular subject are among the best of the kind. It is not my intention, therefore, to reproduce a tabular statement, but since its publication in 1845 quite a number of additional cases have been placed on record by which our knowledge on some points may be rendered more positive, and I shall simply make use of them, in connection with the cases already collected, with the view of elucidating the actual value, as a means of saving life, of the operation in question.

Thomas Murtha, a stone-cutter, thirty-four years of age, of a moderately good constitution, was admitted into St. Vincent's Hospital on the 16th of April, 1852.

Three weeks before he had been stabbed with a knife, in one of the riotous encounters resulting from a strike among the stone-cutters for higher wages. The knife entered on the inside of his right arm, just above its internal condyle, and passed upward and forward in the direction of the main vessels of the limb. He bled quite freely at the time, but went immediately to a neighboring drug store, where a bandage was tightly applied around the arm, and the bleeding arrested; it never afterward returned. The next morning the wounded arm was swelled, discolored, and painful; this condition being attributed to the tightness of the bandage, it was removed and a poultice applied to the wound. Much relief followed this change of dressing, and the natural feeling and color returned gradually to the limb, which, however, remained somewhat benumbed and painful. After the lapse of four or five days the pain suddenly assumed a violent tensive character, and the swelling

increased quite rapidly around and above the wound, followed by discoloration. The pain was excessive; it was described as tensive and burning; cold water poured continually upon the part seemed to afford relief, and at the end of six or eight hours it had abated. In a few days again the extreme swelling of the limb had also diminished for the second time. This sudden swelling, attended by violent pain, and followed by discoloration and gradual subsidence of the urgent symptoms in a few hours, returned three or four times in the course of the next fortnight; each attack (of what I conceive to have been internal hemorrhage from a wound of one of the larger arterial trunks of the limb) leaving, after its subsidence, an increased permanent enlargement of the arm around and above the original wound.

The patient was, meanwhile, under the judicious care of Dr. Duggan, and was seen also several times in consultation by Dr. Mott, from whom I learned that he suspected the injury to be a wound of one of the larger branches of the brachial artery, but did not consider the main trunk of the limb as probably involved on account of the absence of pulsation in the swelling, which, although carefully looked for, was not recognized; at the same time no pulsation had ever been detected at the wrist since the accident.

At the end of the third week the patient's condition, as already described, was becoming more and more unpromising, and it was deemed advisable to send him to the hospital under the charge of the Sisters of Charity, where he came under my care.

At this time the aspect of the case was a very serious one. The patient was much prostrated, and suf-

fering intense pain; his pulse was frequent and feeble, his stomach excessively irritable, and his countenance expressive of great anxiety and exhaustion from prolonged pain and loss of rest. The whole upper extremity was very much swelled, the forearm and hand evidently from œdematous infiltration; but above the elbow it was at least three times its natural size, livid and discolored, and its integuments were exceedingly tense. This distention of the arm proper extended from the elbow well up into the axilla, and it was especially prominent about its center and in front. The whole swollen portion was tense and elastic to the feel, somewhat hot, and it presented at points an obscure but manifest fluctuation. On grasping it with both hands, and feeling as attentively as possible, I was just able to distinguish a faint general pulsation, and on looking across my fingers at the bedclothes, I could also recognize a very perceptible heaving of the whole swollen portion, synchronous with the beating of the heart. On compressing the subclavian artery against the first rib, this heaving was arrested at once. There was no pulsation whatever to be perceived in the radial artery at the wrist. The original wound, about three-quarters of an inch in length, in which there was little or no attempt at reparation, was discharging constantly a bloody serum in moderate quantities. The patient thought that the swelling of his arm was now constantly increasing in size, and that his pain, which was if anything more severe than heretofore, had been continuously growing worse during the last twenty-four hours. He was vomiting everything he swallowed, and was constantly bathed in a profuse

perspiration. The compression of the subclavian artery which arrested the pulsation in the swollen arm, also diminished the pain sensibly while it was kept up.

I was satisfied, as the result of the examination, of the existence of a diffused false aneurism communicating with a wound of one of the arteries of the arm, and, with no guide as to the seat of the wound in the artery, I was satisfied as to the utter impracticability of seeking for it in the existing condition of things; and also, as the axillary artery could not be approached without cutting into the aneurismal cavity, I judged that the best course to adopt for the patient's safety, was to apply a ligature to the main trunk of the limb above the clavicle, and that the sooner this were done the better.

My colleague, Dr. Power, and also Dr. Duggan, who were present, agreed with me as to the propriety of this course, and Dr. Mott, who saw the patient with me in the evening, confirmed the result of our judgment.

The patient in the mean time had morphine in proper quantities, with brandy, beef-tea, and ice.

On the next day, Sunday, a ligature was accordingly placed around the subclavian artery, just on the outside of the scalenus anticus muscle, in presence of the gentlemen mentioned above and several other medical friends. I was assisted by Dr. Metcalfe and G. T. Elliot, Jr., the former of whom kindly administered chloroform with the best effect. I encountered no delay in the performance of the operation; and when the influence of the chloroform, which it was necessary to keep up for about ten minutes, had sub-

sided, the intense pain from which the patient had previously suffered did not return. He expressed himself perfectly relieved from it, and from this time he was able to retain food upon the stomach. This circumstance demonstrates the purely sympathetic nature of the previous condition of the stomach; or, in other words, it shows the disturbing influence of intense pain upon the nervous centers, of which the vomiting was simply an expression.

The extreme tension of the swelling also sensibly diminished after the ligature of the artery, and its pulsation, of course, ceased entirely.

On the next day I found the temperature of the right arm still below that of the left, and on examining it carefully I perceived, opposite to the original wound and extending to some distance below the elbow, a very distinct crackling sensation, caused evidently by the presence of air in the cellular tissue of the limb, and in no inconsiderable quantity. Over the most prominent part of the swelling above the elbow several bullæ had made their appearance, and here the integuments presented the most unmistakable evidences of gangrene. The patient's general condition was comfortable.

On the third day these symptoms were still more prominent, and I began almost to apprehend gangrene of the whole limb; but the patient's aspect was otherwise not unpromising.

On the fourth day a line of demarkation had formed, inclosing a portion of the integuments on the front of the arm over the most prominent part of the swelling, of an oval shape and about five inches in length. There was a diminution in the amount of air in the

cellular tissue of the limb, and its temperature was better, but still below the natural standard. Yeast was applied locally, and the supporting treatment continued.

On the seventh day the slough had separated sufficiently to allow the escape of about a pound of coagulated blood from the aneurismal cavity.

On the fourteenth day the dead tissues had all entirely separated, and the loss of substance, which at first seemed very considerable, is rendered less by the diminution in the size of the limb. Its cavity is granulating, and the strength of the patient is fair; he is taking quinine and generous diet.

On the fifteenth day the ligature separated from the artery. About this time he had an attack of erysipelas, which, on subsiding, left a collection of pus on the outside of the arm just above the elbow. This was evacuated by means of an incision, and on the succeeding day a slight hemorrhage occurred, in which the blood escaped both from the recent incision and through the cavity on the front of the arm. The quantity of blood lost was inconsiderable, and fortunately the hemorrhage did not recur.

The original wound is healing.

During the month following there were several returns of the erysipelas, and the patient's condition became somewhat critical. He was removed from the ward into a private room. Shortly after this, coincident with a sudden change of temperature, he became delirious, with an exceedingly rapid pulse, which at one time exceeded 150 in the minute, and the next day had several convulsions. The existence of arachnitis was suspected, and a fatal term-

ination was anticipated. On account of his prostration, no very active treatment was employed. A large blister was applied to the nape, he was carefully nourished with beef-tea, and had an injection of salt and water daily. Under this management the delirium subsided in a few days, and he very unexpectedly recovered from the acute attack.

He has since done very well; he is now walking about, convalescent. The wound above the clavicle was entirely healed some time since, and the cavity in the arm and axilla has contracted down to a linear wound, which is slowly cicatrizing. As yet, I have not been able to detect any pulsation in the radial artery at the wrist.

The question may be asked, Why was not this case treated as one of wounded artery, by cutting down and applying a ligature to each end of the wounded vessel? My reasons for adopting a different treatment are these: At the time the patient came under my care the position of the wound in the artery could not be ascertained with sufficient certainty to warrant a search for it; three weeks had elapsed since its occurrence, and there was the best evidence of the existence of a fluctuating, pulsating cavity of large size communicating with the wound of the artery; in other words, of a large and rapidly increasing traumatic aneurism, for which the immediate ligature of the main arterial trunk of the limb was the appropriate remedy, as has been proved by the result.

Up to the present date, including the case which I have just narrated, I have collected ninety-seven recorded instances in which a ligature has been applied

to the subclavian arteries, and I have learned the particulars of four other cases verbally from the operators, making in all one hundred and one; these include, of course, operations upon each of the three divisions of the artery and on both sides of the body. I do not know that I have succeeded in finding all the cases which have been placed upon record; but the number is large enough to serve as a fair foundation for statistical data.

There is one circumstance which has forced itself upon my attention in looking over the records of the operation, viz., that those followed by recovery are more fully reported in general than those of an opposite termination; indeed, in regard to the latter, the data are sometimes painfully scanty; and from this I infer that in the cases which have never reached the light, the average mortality is probably much greater than the result of my investigation will show it to be. This is one of the unavoidable sources of fallacy in researches of this nature; and, after having stated it fairly, each must make his own allowances for such sources of error in his estimate of the result.

In the 101 cases, the ligature was applied upon the artery within the scaleni muscles in 8 instances—7 times on the right side, and once on the left. Colles, of Dublin, was the first who placed a ligature on the internal portion of the subclavian on the right side, and his patient died on the eighth day with a wound of the pleura. In every succeeding instance in which this operation has been attempted, death has followed from secondary hemorrhage, at periods varying from the twelfth to the thirty-sixth day, with the exception of the most re-

cent case on record, that of Mr. Partridge, whose patient died on the fourth day, with "general febrile and inflammatory symptoms."

The subclavian artery has been tied but once within the scaleni muscles on the left side, and this operation was designed and executed in this city, in the year 1846, by the late Dr. John Kearny Rodgers. Previous to this case, operators had been deterred from attempting its ligature on account of the greater depth of the artery on the left side, and its more important relations, especially by the vicinity of the thoracic duct. Dr. Rodgers's patient died also, from hemorrhage, on the fifteenth day.

For anatomical reasons, which it would be foreign to our purpose to discuss at present, it is to be feared that the ligature of the subclavian artery in this part of its course, which has in every instance, thus far, proved fatal, will never be followed by a different result. I have, nevertheless, heard Dr. Rodgers express the opinion that he would feel justified in attempting his operation again, with the addition of passing a ligature at the same time around the vertebral artery near its origin, with the view of obviating distal hemorrhage. The value of this suggestion remains to be proved. It is to be remembered that Liston, in one of his operations on the right shoulder, adopted the suggestion of Mr. Quain with the same object, and tied the carotid near its origin, as well as the subclavian; but on the eleventh day hemorrhage came on as usual, and on the thirteenth day the patient died.

This operation has been been done in six instances for true aneurism, and in the two others for aneurism following a wound involving to a variable extent the

external portion of the trunk of the subclavian. For the cure of these forms of disease, in this situation, we must hope that some ingenious modification of the successfully revived treatment by compression may hereafter succeed better than the operation of John Hunter, which in other parts of the body has been the means of saving so many lives.

In 1819, Baron Dupuytren, at the Hôtel Dieu of Paris, in a case of very large aneurism following a wound of the axilla, where the external portion of the subclavian was inaccessible from the extent of the tumor, cut across the scalenus anticus muscle near its origin, with a probe-pointed bistoury, and applied his ligature to the artery behind this muscle, or, as it is called, in the middle part of its course, and he had the satisfaction of curing his patient. This same locality was selected by Auchinloss, in Scotland, for the application of the ligature in a similar case, in 1833; but his patient died comatose in sixty-eight hours. Our countryman, Dr. J. C. Warren, repeated the operation again with success in 1843. The danger of injury to the phrenic nerve is the greatest obstacle to the repetition of this operation, and this is a possible source of danger, as will be seen from a case to be mentioned hereafter. Avoiding this danger, however, which seems within the bounds of possibility, this operation appears to deserve more attention than it has received, considering the success which has followed it so far.

As far back as the year 1800, the English army surgeon Keate cured a case of spontaneous axillary aneurism in a young man of twenty-five, by tying what was then called the subclavian artery, below

the clavicle. Where Keate applied his ligature, is now known as the axillary artery, surgical anatomy having since defined the boundaries and limits of parts more accurately. This operation was repeated in 1815 by Chamberlaine, 1813 by Blasius, and in 1835 by Catanoso, in Sicily, in each instance for a wound of the axillary artery or traumatic aneurism of recent formation, and with but one fatal result out of the four cases. This, a case of wounded axillary artery was improperly treated, according to Prof. Blasius, at first, as in his opinion the wounded artery should have been sought for and tied in the wound; this had not been done, however, and after repeated hemorrhages he was called to tie the main trunk on the twentieth day, as the only chance remaining for the patient. He tied it as near as possible to the seat of the injury; but the patient sank exhausted from the previous loss of blood, and died on the following day.

But the most successful, and consequently the most useful of the operations upon the subclavian arteries is its ligature in the third part of its course or external portion, beyond the scaleni muscles. Here the anatomical relations of the arteries are similar on either side of the body. This operation was first performed at St. Bartholomew's Hospital, in London, by Mr. Ramsden, in 1809, but like many other of the operations on the great vessels, which afterward became generally adopted, its first essays were unsuccessful. The first human life saved by it was in the hands of Prof. Wright Post, in this city, in the year 1817; it was afterward successfully performed for the first time in Great Britain, by Liston, in 1820.

Of the 101 cases which I have collected, the opera-

tion on the external portion of the artery comprises 86; and of this number 53 were successful, and 33 died, making a mortality for this operation of 3·83 per cent., or one in 2·6.

Thus, to sum up the comparative mortality of the operations on the different portions of the subclavian artery, we have the following result:—

Of 8 operations within the scaleni muscles, 7 on the right and 1 on the left side, all were fatal.

Of 3 operations upon the artery between the muscles, 2 succeeded and one died.

Of 4 ligatures applied below the clavicle, 3 succeeded and 1 died.

Of 86 operations upon the external portion of the artery, 53 were successful and 33 died.

Making an aggregate of 101 operations and 43 deaths, or 42·5 per cent.

Dr. Norris's table, published in 1845, shows a total of 69 cases and 33 deaths, or a per centage mortality of 47·8. Thus the lapse of seven years has improved the aggregate mortality of the operation more than 5 per cent. This arises from the fact that the fatal results of the operations upon the inner portion of the artery have led to their less frequent performance, and the additional cases are made up of operations upon the external division of the artery, a large proportion of which are successful.

The ligature of the external portion of the subclavian is then the most useful and the most hopeful of good results, and therefore the most interesting of the operations upon the subclavian arteries. I propose to add some data calculated to elucidate the causes of death in the fatal results which have fol-

lowed this operation, and the dangers to be avoided in its performance, and thus by demonstrating the actual value of the operation and the cases to which it is applicable, to contribute, if possible, to a still further diminution in its mortality.

Of the 86 operations, 38 were performed for true aneurisms; of these, 25 were cured and 13 died.

Twelve were operated upon for traumatic aneurism; of these, 9 recovered and 3 died.

Fourteen operations were performed for wounded axillary artery; of these, 7 recovered and 7 died.

Five were distal operations; of these, 2 recovered and 3 died.

In 3 cases operated upon, the disease was mistaken; of these, 2 died and 1 survived.

In 14 cases the nature of the disease is not stated, or expressed in doubtful terms. (They were all, however, aneurisms or wounded arteries.)

In investigating the comparative mortality after ligature of the main arterial trunk of the upper and lower extremities, I find that the result is *in favor of the lower extremity*, comparing the outer third of the subclavian with the external iliac; thus in 149 cases which I have collected of ligature of the external iliac arteries, 49 of them were fatal; showing a mortality for this operation of 32·8 per cent., or not quite 1 in 3. The mortality of ligature of the external portion of the subclavian is 38·3 per cent., or 1 in 2·6. If the comparison were instituted between the operations on the subclavian arteries without regard to its subdivisions, and the primitive internal and external iliacs, the difference would be still greater in favor of the lower extremity. The reasons for this difference

will be seen hereafter in connection with the causes of mortality, but the fact is evident that the operation of tying one of the subclavian arteries on the outside of the scaleni muscles is more dangerous to life than a similar operation upon the external iliac.

Period of separation of the ligature.—The earliest date at which the ligature came away was in Manec's case, on the 9th day, and the latest in Dr. J. M. Warren's, where it remained until the 96th day. The fact of the separation of the ligature is noted in 49 cases out of 86; in the greatest number it occurred on the 16th day: of the remainder it took place on the 10th day in 1; on the 11th in 3; on the 12th in 5; on the 13th in 3; on the 14th in 2; on the 15th in 3; on the 17th in 5; on the 18th, 19th, and 20th, each 2; 21st, 4; 23d, 1; 27th, 1; 31st, 2; 47th, 1; and 85th, 1.

Causes of death.—In the 33 fatal cases, death occurred in 12 from secondary hemorrhage, in 6 from gangrene; 4 from inflammation within the cavity of the chest; 3 from exhaustion from suppuration of the aneurismal sac; 1 from constitutional irritation from sloughing of sac; 1 from hospital gangrene; 1 from dyspnœa, its cause not stated; 1 from irritation caused by inflammation of phrenic nerve; 1 from exhaustion from repeated hemorrhages from original wound, and from repeated operations; 1 from encephaloid tumor of axilla; 2 from causes which were doubtful, or not stated.

From this abstract it appears that the danger most to be dreaded after ligature of the external portion of the subclavian is hemorrhage, and this has arisen, in the fatal cases above recorded, from several sources.

In 9 out of the 12 instances in which it caused death, it took place from the wound made in tying the artery, *i.e.* from the artery itself under the action of the ligature; here the source of danger is a diseased condition of the arterial coats which interferes with the adhesive process, and it is to be avoided by not venturing too near the seat of disease, (when there is a true or spontaneous aneurism depending upon an altered state of the arterial tunics,) and by examining into the condition of the artery, as far as practicable, before passing the ligature around it at the time of operating. This latter precaution has prevented the ligature of the arteria innominata in two instances, after the vessel had been laid bare, viz.: in the cases of Dr. Porter, of Dublin, whose patient, strange to say, ultimately recovered spontaneously, and in that of Dr. Hoffman, of this city. It has also caused other operators to hesitate under similar circumstances. In confirmation of this view, we find that eight out of the nine cases in which secondary hemorrhage from the point of ligature proved fatal, were spontaneous or true aneurisms, resulting from alteration of the arterial coats and in the remaining one the blood found its way from the axilla upward through the wound above the clavicle.

In the remaining three of the twelve cases in which hemorrhage after the operation caused death, two were traumatic aneurisms in which the wounded artery furnished the hemorrhage after the giving way of the sac, and in the remaining one, the disease for which the artery was tied proved to be an encephaloid tumor. In addition to these twelve deaths from hemorrhage, it occurred in six others of the thirty-three

fatal cases, and contributed more or less to their unsuccessful result without directly causing it. Hemorrhage is also mentioned as having occurred in eight of the cases which subsequently terminated favorably; it took place, therefore, to a greater or less extent, in twenty-six cases out of the eighty-six which I have recorded, or in nearly one-third, and was fatal in twelve cases out of the twenty-six.

I find that after hemorrhage from the artery at the seat of ligature, resulting from a deficiency in the reparative process, caused by a morbid condition of the arterial coats, the next most frequent source of bleeding, in the cases on record, is *from the seat of the disease* in the artery, generally the axilla, whether this disease has been a spontaneous aneurism, a traumatic aneurism, or a simple wound of the artery. And hemorrhage from this source has occurred at an earlier period, and most frequently where the subclavian has been tied for a wound of the axillary artery, no aneurismal tumor having formed; thus confirming the propriety of the rule in surgery, that the best treatment for a wounded artery, where feasible, is to cut down and tie it above and below the wound, and never to have recourse to the ligature of the main arterial trunk of the limb until this course has been proved to be impracticable. Thus, on reference to the facts already stated, we find that in fourteen instances where the subclavian was tied for a wounded axillary artery, one-half the cases perished. It will be readily understood, then, that hemorrhage from the seat of disease has occurred in more cases of traumatic than of spontaneous aneurisms; and that in both it has followed sloughing, suppuration, or open-

ing of the sac, and has been furnished through the collateral channels by which the circulation at the seat of the disease has been restored.

To sum up, then, with regard to hemorrhage, the most dangerous symptom which can follow the operation under consideration, it is most to be feared from the seat of the ligature, and about the period of its usual separation, (say from the tenth to the fifteenth day,) and in cases of spontaneous or true aneurism. (It has already been seen that this is the form of disease for which in much the larger proportion of cases the operation has been required.)

In cases of traumatic aneurism, or wounded artery, it is most to be feared *from the seat of the disease*, and is liable to occur at *any period after the establishment of the collateral* circulation in the limb, and until all wounds are healed. Before leaving the subject of hemorrhage, I will refer to two cases on record, in which the sac of the aneurism involving the external portion of the artery, and extending above the clavicle, was accidentally perforated during the operation, giving rise to fearful loss of blood. The operators were Travers and Mott, and the hemorrhage in each instance was permanently controlled by pressure, although Mr. Travers's patient subsequently died from inflammation in the cavity of the chest.

The next most frequent cause of death after ligature of the subclavian in its external portion has been shown to be gangrene, to which the unsuccessful result of *six* cases out of thirty-three is attributed. This is the immediate consequence of interruption of the circulation in the limb, either by the disease itself, or by the ligature of its main arterial trunk, which

has been rendered necessary by it, and it is a result which can neither be foreseen nor certainly prevented. The frequency of its occurrence, which is greater, I presume, than is generally supposed by surgeons, shows the necessity of adopting all the precautions usually employed in the case of the lower extremity under similar circumstances. With regard to the period after the operation at which death took place, I find that in one it occurred on the third day, in one on the fourth, in two on the sixth, in one on the eighth, and in another it is simply stated that it took place "in a few days."

Of the six cases, the disease was spontaneous aneurism in one-half and traumatic in the other. I am unable, on perusal of the cases, to gain any information as to particular causes worthy of remark to which the occurrence of gangrene could be attributed.

Besides the six cases where it was the cause of death, gangrene of two fingers occurred in an otherwise successful case of Mr. O'Reilly, of Dublin, mentioned in one of his articles in the *Cyclopædia of Anatomy and Physiology*, and also in the case of Prof. Parker, of this city. In the successful case recorded by Prof. Alf. C. Post, he was obliged to amputate near the shoulder-joint in consequence of a wound of the axillary artery; this, however, involved the vein and large nervous trunks of the limb.

There are, then, in the whole, 8 cases out of the 86, in which gangrene followed the ligature of the subclavian artery in its external portion, or nearly 19·4 per cent., and 6 of these were fatal.

In looking over the abstract of 149 cases of ligature of the external iliac artery, to which I have already re-

ferred, I find that gangrene occurred in 23 of them, or in 15·4 per cent., and of these three recovered after amputation, the remainder being followed by death. Thus, the danger of gangrene after ligature of the external iliac is nearly twice as great as after the same operation on the external subclavian; in fact, after ligature of the external iliac, gangrene is to be dreaded as the most frequent cause of death; whereas, in the upper extremity, hemorrhage holds the first place in point of danger. In the four cases in which intra-thoracic inflammation was the cause of death, pleuritis with effusion, pleuro-pneumonia, and pericarditis. In one of these (Dr. Gross's case) the sac of the aneurism burst into the cavity of the pleura a month after the operation. This same accident occurred in Mr. Bullen's case, and bloody pus was coughed up in large quantities by the patient, who ultimately recovered. One of the cases fatal by pleurisy was that of Mr. Travers, where the sac was perforated during the operation.

I shall not consume the valuable time of the Society any further at present, by a reference to the remaining causes of death in detail, but merely ask attention, before closing, to one or two incidents of more than usual interest. The following unique case, in addition to its novelty, will also serve to show the scanty information to be acquired in relation to some of the fatal cases which I have collected, no other account of it being attainable, save the following particulars: In the minutes of one of the meetings of the Royal Medico-Chirurgical Society, reported in one of the numbers of the *London Lancet* for 1849, Mr. Bransby Cooper is said to have stated, in connection

with a case of ligature of the subclavian which had just been reported, that he had once performed this operation upon a thin male, and that immediately on tightening the ligature, the patient was seized with a constant and continued short cough, which went on until he died. On examination, the phrenic nerve was found to be uninjured, but highly inflamed, as well as its neurilemma.

In one of Mr. Symes's cases, in which the subclavian was tied for a rupture of the axillary artery, hemorrhage still persisting from an incision made in the axilla, for the purpose of exploration, amputation was performed at the shoulder-joint, and the patient ultimately got well.

In Mr. Mackenzie's fatal case, reported in a recent number of the *Edinburgh Monthly Journal*, on examination no aneurismal sac was found, but the artery opened directly into the cavity of a large abscess below the clavicle, thus forming a peculiar variety of aneurism, as he thinks, which was first described by Liston, in connection with the primitive carotid.

In an operation by Manec, already referred to, (reported in the *Gazette des Hôpitaux*, 1849,) air entered the external jugular vein, which was necessarily divided, producing convulsions and syncope, but the patient recovered.

In the fatal case of the French surgeon Galtie, reported by Delpech, the head of the humerus being shattered by a gunshot wound, was exsected; hospital gangrene attacked the wound, and the limb was removed at the shoulder-joint; the gangrene returned in the stump, and having involved the artery, hemorrhage took place, for which the subclavian was tied.

Of the 101 cases I have collected, 21 belonged to American surgeons, and 6 out of the 21 were fatal. Here the mortality is below the general average.

Of the 21 American cases, 13 belong to New York, and these include the first successful operation on the external subclavian, by Wright Post, in 1817; the second operation ever performed on the internal subclavian, by Mott, in 1831; and the first operation ever performed on the left internal subclavian, by Rodgers, in 1846. Eleven of the 13 operations were performed on the outside of the scaleni muscles, and 10 of these were successful.

SALIVARY FISTULA.

COMPLETE SALIVARY FISTULA OF THE DUCT OF STENO, FOLLOWING GUNSHOT WOUND, CURED BY OPERATION.*

Dr. W. H. Van Buren related the case of a general officer of the army, who had been wounded near Chattanooga, Tennessee, by a Minié ball which passed through both cheeks, carrying away most of the teeth in the upper jaw, opening the right antrum, and leaving, when the wound was healed, a complete fistula in the right cheek, through which all the saliva from the parotid of that side escaped, there being entire obliteration of the extremity of the duct of Steno, which should have opened into the cavity of the mouth. The fistulous orifice was situated in the center of a large cicatrix, about an inch behind the anterior border of the masseter muscle. It was capillary in size, and when not discharging saliva could hardly be distinguished without the aid of a lens. On the inside of the mouth no orifice could be discovered on minute and repeated inspection, and its dryness was confirmed by the patient, who asserted confidently that no saliva flowed into his mouth on that side. From the fistulous orifice, on the contrary, the

* Extracted from the Minutes of the N. Y. Medical and Surgical Society, meeting of Jan. 28th, 1865, by Foster Swift, M.D., Secretary. (Published in the N. Y. Med. Journ., vol. i. No. 1, p. 53.)

flow of saliva was profuse, and of constant recurrence when the gland was excited, rendering the patient's condition extremely unpleasant. An operation for his relief had already been attempted without success. The amount of cicatricial tissue in the cheek, and the shortness of the remaining portion of the duct of Steno, were recognized as the principal obstacles to the success of an operation. Dr. Van Buren planned and executed the following operation in May last, which, after some delay, has resulted in an entire cure.

The orifice of the fistula was circumscribed by two curved incisions, in the direction of the fibers of the buccinator muscle, isolating a portion of the skin of the cheek of an elliptical shape, and leaving a wound an inch and a quarter in length. The isolated portion of integument, with the fistulous orifice in its center, was dissected up from its connections, except with the duct, and this was traced up and isolated as far as the substance of the gland. The knife was then carried through the cicatricial tissue, fat, and fibers of the buccinator, just in front of the anterior border of the masseter muscle, until the mucous membrane of the mouth alone intervened between the bottom of the wound and the buccal cavity. The elliptical portion of skin was now trimmed down to a circular disk about one-third of an inch in diameter, with the fistulous orifice in its center, and through this disk of skin two silver wires were carried by needles, parallel with its surface, one on either side of the orifice of the fistula. The two ends of this double wire were then, by means of large-eyed needles, carried from the bottom of the wound,

through the mucous membrane of the mouth into its cavity, the two points of perforation being about half an inch distant from each other; and, by careful traction, the disk of skin containing the fistulous orifice was brought as nearly as possible into contact with the outer surface of the mucous membrane of the mouth, at the bottom of the deep wound at the anterior edge of the masseter. The extremities of the double wire were then twisted tightly together until their loop, including the half inch of mucous membrane and the disk of skin from the cheek, was so small as to keep these parts as closely approximated as possible, without too much tension either of duct or mucous membrane. These twisted ends of the double wire were left about three inches long, and brought out at the corner of the mouth, where they caused but trifling inconvenience, and came away spontaneously in the fifth week after the operation. The edges of the elliptical wound of the cheek were then brought together by means of ten sutures of fine silver wire, applied by Dr. Emmet, to whose skill at this stage of the operation Dr. Van Buren mainly attributes its ultimate success. Collodion was applied over the sutures, and the patient fed upon beef-tea.

Very considerable inflammation occurred during the ten days succeeding the operation, in which the parotid gland was involved, and several abscesses followed each other for more than six weeks, through which saliva escaped for a day or two at a time, but the silver seton in the mouth kept a channel open in that direction, and the wound in the cheek finally healed firmly and soundly. Some of the anterior fibers of the masseter muscle were divided, in order to dimin-

ish the tension of the duct, which was barely an inch in length. The inflammation of the parotid gland Dr. V. B. attributed to an experiment he instituted, on the authority of Prof. Claude Bernard, of the College of France, who asserts, as the result of his physiological experiments, that the injection of any fatty substance (*corps graisseux*) into the duct of the parotid will arrest its secretion and produce atrophy of the gland. He injected the fistula with melted lard by means of an Anel's syringe, carefully and thoroughly, as the first step of the operation related above, but the result was negative. The gland is still secreting freely as ever, at the end of nine months, as was demonstrated by examination of the patient to-day, when the orifice of the new duct was distinctly seen discharging saliva into the mouth, the external cicatrix having softened down, and being entirely concealed by the whisker.*

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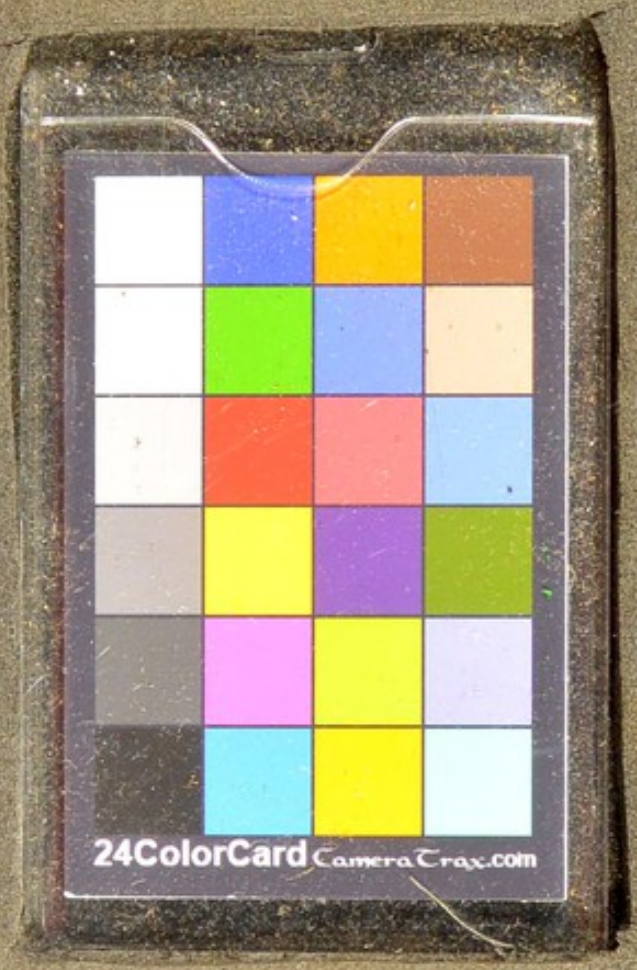
* The object sought by this operation was to remove the open end of the parotid duct, from the external surface of the cheek to its normal relation to the mucous wall of the mouth, as perfectly as its diminished length would permit, and to keep it there by means of a ligature, which should at the same time perform the office of a seton and establish a permanent opening into the mouth; and also to have a clean wound in the cheek, which could be successfully closed by silver sutures. It is a mode of operation which Velpeau claims to have proposed in 1823, but which he states (Oper. Surg., vol. iii. p. 32, Am. ed.) has not yet been put to the test. The employment of silver wire seems to have conduced to the success of the operation.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