TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, May 2, 1898.

The President, J. Ewing Mears, M.D., in the Chair.

INTRAPERITONEAL RUPTURE OF THE BLADDER.

Dr. John Ashhurst, Jr., reported the case of a man who had been injured by a fall while drunk, and who had a small wound on the right side of the scalp, to close which two sutures had been introduced. There was a small area of abdominal ecchymosis, and the abdomen was distended, tympanitic, rigid, and tender, the swelling extending almost from the pubes to the chest.

There was dulness laterally in both flanks, with acute pain throughout the abdomen. No urine had been passed since the accident, and the bowels had not been moved. The resident physician had introduced a catheter and had drawn off about three fluidrachms of a dark-red fluid, which contained much blood. The diagnosis of rupture of the bladder was made, and was confirmed by the introduction of sterilized water to the amount of four fluidounces, only a few drops returning through the catheter.

The patient was then etherized and placed in the Trendelenburg position, the rectum being distended by means of an inflated india-rubber bag. The abdomen was opened by a median incision, a large quantity of fluid being found in the peritoneal cavity. When the fluid escaped, a large irregular opening was seen in the fundus of the bladder, extending also into its anterior wall, the rupture thus being both intraperitoneal and extraperitoneal. The vesical wound was carefully closed, interrupted Lembert sutures of silk being used for the intraperitoneal part, while a continuous suture was employed for the remainder. The abdominal cavity was then washed out with normal salt solu-

tion, and the external wound closed, a glass drainage-tube having been introduced and lightly packed around with iodoform gauze.

A soft rubber catheter was introduced into the bladder and retained in order to prevent urinary accumulation. The pulse became rapid during the operation, and shortly afterwards the temperature was recorded as 98° F., the pulse 120, and the respirations 42. The highest temperature was recorded three days later, just before death, when it rose to 105°. The tube in the abdominal cavity was cleansed every half hour. The patient was given strychnine and digitalis hypodermically and carbonate of ammonium by the mouth. The fluid removed through the tube at each cleansing amounted to about two teaspoonfuls, and urine was passed freely through the catheter.

The next day the patient had some cough, with pain in the abdomen, and he complained of thirst. On the second day milk was given in small quantities. The patient passed a good deal of flatus, and for the first forty-eight hours the abdomen remained quite scaphoid, but subsequently began to swell. The night before death he vomited some green fluid. An evacuation of the bowels was secured by an enema of magnesium sulphate, but the abdominal distention continued; the patient became delirious, and death followed at the end of three days.

Dr. Ashhurst referred to the rarity of uncomplicated rupture of the bladder, and said that there were probably not more than 150 cases on record; rupture of the urethra was much more frequent. Rupture of the bladder is almost always due to external violence, the viscus being distended at the time, and sometimes may be caused by counter-stroke, as by a fall on the buttocks. Bartels's statistics of intraperitoneal rupture of the bladder treated without operation showed but four recoveries out of ninety-eight cases, though when the rupture was extraperitoneal the mortality was not so high, twelve patients recovering out of fifty-four.

The modern treatment by abdominal section and suture affords better results, thirty-three intraperitoneal cases thus dealt with having given thirteen recoveries, a mortality of only 61 per cent. as contrasted with 96 per cent. under the old methods; and it is interesting to remember that the first suggestion of the modern practice was due to the late Dr. S. D. Gross, the founder of this academy.

When the rupture is extraperitoneal, the treatment may consist in drainage by a catheter alone, if this can be passed immediately; or, if extravasation has occurred, by prompt cystotomy, either by a perineal opening or above the pubis.

As to the diagnosis of intraperitoneal rupture, the symptoms will suggest the nature of the case, the patient being unable to pass any water, and evidences of peritonitis being quickly developed. But the surest test is that suggested by Dr. Weir, the injection of a definite quantity of fluid, and the attempt to withdraw the same through a catheter. When no fluid is returned, the inference is that the rupture is intraperitoneal, and that laparotomy is necessary. The Trendelenburg position is of great advantage in this operation, in facilitating the exposure of the vesical lesion, and distention of the rectum is also important. When the seat of rupture is brought into view the opening should be closely sutured, as in other wounds of hollow viscera.

DR. OSCAR H. ALLIS said there was one way in which the bladder might be injured besides those mentioned by Dr. Ashhurst,—viz., the separation of one portion of the pelvis from the other. The attachments of the crura penis are such that the urethra and bladder may be torn by a separation of the sides of the pelvis.

DR. G. G. DAVIS inquired as to what means might be taken to avoid the occurrence of such peritonitis as had developed in the case reported. In all intraperitoneal operations, involving the hollow viscera, the danger of peritonitis from leakage, in spite of the most careful suturing, is very great, and the question is what can we do to guard against it. He believed a most efficient method was to isolate the seat of operation by packing, using a sufficient amount of gauze to push the intestines some distance away from the wound. Upon its removal, in thirty-six hours, a passage is left separated from the peritoneal cavity, which would provide exit for infectious material and guard against infection travelling from the bladder to the general peritoneal cavity. He was sure this method of thorough isolation of the wound would save some cases which would otherwise die of infection.

DR. GEORGE ERETY SHOEMAKER commented upon the use of the Trendelenburg position. Because of its acknowledged tendency to spread any infective fluids which may be confined by gravity to the lower abdomen, the question arises whether, in

dealing with such cases, it might not be wiser to thoroughly flush immediately after opening the abdominal cavity, pack with gauze, and then raise the patient before suturing.

It had been shown by the catheter that the bladder was empty, and no further escape from it into the peritoneal cavity need have been feared for a few minutes.

DR. DEFOREST WILLARD remembered several cases of gunshot wound of the bladder in the War of the Rebellion; all fatal.

As to lacerations of the bladder, he also remembered one case of litholapaxy, where the stone, after being grasped, moved with fair ease, but seemed to pull upon the bladder in one direction. Symptoms of rupture of the bladder developed immediately with intense pain. This was some years ago, when operations within the peritoneal cavity were not as common as they are now, but even had he opened the abdomen he would not have reached the site of the laceration. The patient died on the second day, and the post-mortem proved the existence of a rent below the line of the peritoneum and between the bladder and the rectum.

As to the great distention of the bladder, it rarely results in laceration. He remembered one case in which the bladder had been in a state of distention for four months. It contained twenty-nine pints of urine, but did not rupture, although it filled the entire abdomen.

DR. ASHHURST remarked, in rejoinder, that it was true that the Trendelenburg position had the disadvantage of allowing fluids to flow back, which was one of the reasons why he did not ordinarily employ it; but he thought that where an organ like the bladder was ruptured, the first indication was to stop the escape of its contents. To begin with washing out the peritoneal cavity, before closing the vesical wound, would not be a very successful procedure. The first indication is to close the visceral wound so as to prevent further escape of urine, and then to wash out the cavity.

As to the use of gauze packing, he did introduce gauze over the wound of the bladder. He would not suggest tightly closing the abdomen where the bladder had been ruptured, and particularly where there had been for some time an opportunity for the escape of urine.

He had been interested in Dr. Allis's remarks as to rupture of the bladder from separation of the bones of the pelvis.

Some years ago he had operated on two cases of penetrating wound of the bladder, one intraperitoneal and the other extraperitoneal, the former patient dying in a few days, and the latter recovering. Peritonitis develops very rapidly in the intraperitoneal cases, and particularly where the urine is of a morbific character. In the case he had just reported peritonitis had already developed before he saw the patient. His history adds one more fatal case to the records of ruptured bladder, but it shows what we should recognize as the proper treatment of these injuries. Even with prompt operative interference the mortality will be high, but it seems better to do whatever is possible than to abandon the patient altogether. With a record of ninety-four deaths out of ninety-eight cases from non-interference we should operate without hesitation, and with our modern methods of treatment we may hope for recovery in a fair proportion of cases.

GANGRENE OF THE RECTUM.

Dr. H. R. Wharton reported the case of Miss G., forty-eight years of age, who had been sick for a few days, when he was asked by her physician to see her, on account of some discomfort which she complained of in the region of the anus, where there was some swelling and œdema of the skin. Her temperature had been running about 102° F., and her pulse 116.

Upon examination of the patient, finding marked induration of the skin surrounding the anus, he made a long curved incision on each side of the anus, and exposed gangrenous connective tissue in each incision; he could pass his finger well into the ischio-rectal fossæ on each side of the rectum, and the rectal wall exposed in the wounds was seen to be of a grayish, leaden color, and had a gangrenous appearance. The wound was thoroughly irrigated with a 1 : 2000 bichloride solution, and strips of iodoform gauze were introduced for drainage. The patient's condition remained the same for a few days, and there was discharged from the wounds dark-colored, offensive pus, with shreds of connective tissue.

A few days later examination disclosed the fact that the lower portion of the rectum was gangrenous, and that a perforation had occurred, and that fæcal matter was escaping freely through one of the incisions; the anus and sphincter remained intact, all fæcal matter escaping through one of the wounds. The wounds were freely irrigated, a number of times each day, with a

solution of permanganate of potassium, 1 : 2000. To facilitate the escape of sloughs and fæcal matter he divided the sphincter muscle, and a few days after this a tubular slough escaped, which, on examination, was found to be about three inches of the lower end of the rectum. After this the patient's general condition improved, the fæcal matter escaping freely through the incisions, and the cavity left after the sloughing tissue had escaped was filling up with healthy granulations.

Some weeks after this the patient's general condition had very markedly improved, and she was about to be removed to the country, when, during a very warm spell of weather, she suffered from an attack of heat-exhaustion which almost proved fatal. After this she was removed to the country, but was in a very weak condition, and in a few weeks failed so much that she gradually died of exhaustion.

Dr. Wharton added that gangrene of the rectum, aside from that condition resulting from unreduced prolapsus of the rectum, is a rare condition. The vitality possessed by the rectum, as well as other portions of the intestinal tract, permitting it to be subjected to severe traumatisms, without the production of gangrene, and also protecting it against infection. The conditions often observed in strangulated hernia, and in foul abscesses, in close relation to the intestines, where the surrounding tissues are infected and become gangrenous while the intestine remains unaffected, as is often seen in appendical abscesses, are evidences of the immunity which its vitality furnishes. Cripps, Ball and Kelsey, and other writers upon diseases of the rectum, mention gangrenous affections of the rectum, but do not record any such well-defined cases of gangrene of the rectum as the one I have herewith reported. He had only been able to find three other cases similar to the one he had recorded. Dr. J. E. Hulbert (*New Orleans Medical and Surgical Journal*, Vol. vi, p. 72) reports the case of a man of intemperate habits, fifty-two years of age, who applied to him for treatment. The patient had six months before suffered from pneumonia. At the time he came under observation the belly was hard and distended, and he suffered from a mucopurulent discharge from the rectum, with the presence of scybalous masses. This patient, fifteen days later, while at stool, passed a slough from the anus, which, on examination, was found to be the entire rectum, and he died five hours later. Autopsy

revealed the fact that the gangrenous mass passed consisted of the rectum from the sigmoid flexure to the anus.

Dr. J. P. Judkins (*Ohio Medical and Surgical Journal*, September, 1848) reports a case of inflammation and sloughing of the rectum in a man aged forty-five. The first symptoms were those of irritation at the neck of the bladder, but the patient later passed a small amount of blood from the rectum, mixed with sanious fluid, and on the thirty-second day of his illness a slough, three inches in length, protruded from the anus, being adherent at the internal sphincter. The patient died a month later from exhaustion. A post-mortem examination showed entire destruction of the rectum, from the lower border of the promontory of the sacrum to the anus.

Larrey (*Journal de Chirurgie*, Desault, Paris, 1792, Vol. iv, p. 97) reports the case of a soldier, who applied for treatment for what appeared to be an ordinary urethritis, which responded to treatment. After a few weeks he was suddenly seized with severe colicky pains in the abdomen, followed by vomiting; the pulse became small and intermittent, the patient falling into a state of collapse, and died in thirty hours after the appearance of these symptoms. A post-mortem examination in this case revealed the fact that the rectum was gangrenous from the sigmoid flexure to the anus.

Cases of gangrene of limited portions of the rectum have been recorded by many writers. G. Baumgartel (*Zeitschrift für Wund Aerzte und Geburtshülfer*, 1877, No. 28, p. 104) reports the case of a male, aged forty-four years, who was seized with vomiting and constipation, which did not yield to ordinary measures; there was pain in the left sacral region anteriorly, and the presence of a soft tumor could be demonstrated. On the twentieth day collapse developed, and the patient passed a piece of tubular slough of mucous membrane, three inches in length and two inches in diameter. After the removal of the dead tissue the patient improved, and in six months had recovered, but suffered from stricture of the lower portion of the rectum, which was treated by dilatation.

W. M. A. Wright (*Transactions of the Academy of Medicine*, Dublin, 1885) reports the case of a partial sloughing of the rectum in a woman, aged sixty-five years, which came on suddenly. The patient had suffered from hæmorrhoids for a long time. The

sloughing of the rectum was preceded by an attack of acute inflammation of the piles. There was a marked erysipelatous inflammation of the surrounding tissues, and the formation of a fistula, and later an abscess. The portion of the rectal wall which sloughed was about the size of a half-crown. The sloughing in this case was attributed to the pressure of a mass of impacted fæces. The patient made a good recovery without the formation of a stricture.

N. DAVIS COLLEY (*Transactions of the Pathological Society*, London, Vol. xxxvii, 1886) reports a case of partial gangrene of the rectum, in a man thirty-seven years of age, in which a tubular slough of the mucous membrane of the rectum, three inches in length and two inches in diameter, had been passed by the anus. This sloughing occurred from the use of an enema consisting of an ammonia mixture and liquor ammonia. This patient recovered with a stricture, which gradually improved under dilatation, so that he passed natural movements.

As far as the reports of the cases show, complete gangrene of the rectum has always been fatal. If, however, a patient suffering from gangrene of the rectum should recover, the stricture resulting would probably cause, sooner or later, symptoms of intestinal obstruction, so that a colostomy would be required. After this, if too large a portion of the rectal wall has not been destroyed, and the sphincter remained intact, it might be possible to dissect the rectum loose, and bring it down and attach it to the skin.

In cases of gangrene of a limited portion of the rectum, recovery usually takes place, the patients in most cases suffering from stricture of the rectum, which seems to have been amenable to the treatment by dilatation.

DR. WHARTON also related the following two cases of gangrenous periproctitis: Miss C., aged forty-five years, was said to suffer from hæmorrhoids, and was under the care of an irregular rectal specialist, who, under nitrous oxide gas, dilated the sphincter, and probably made some application to the hæmorrhoids. She returned to her home in the country, a few miles from Philadelphia, and suffered so much pain in the region of the anus that upon the following day she sent for her family physician. Dr. Wharton was called to see her with her physician on the third day after the operation of dilatation of the sphincter, and found

her suffering from great pain in the region of the rectum and the lower part of the abdomen; the belly was distended and tender on pressure, temperature 103° F., and pulse 120.

Upon examining the anal region the tissues were swollen and of a dull red color. The swelling and induration extended well out upon the buttocks. No localized spot of suppuration could be found, but upon pressure over the indurated tissues crepitation could be elicited.

The patient was etherized, and long, curved incisions were made through the indurated tissues on each side of the anus, outside of the line of the sphincter muscle, opening freely the ischio-rectal fossæ. Upon exposing the connective tissue it was found to be of a dull gray color, and there was discharged a little thin, grayish fluid. The finger passed into the incision could be carried around the rectal tube and brought up as high as the promontory of the sacrum. The connective tissue, which was found to be gangrenous throughout, was broken down with the finger, and the wounds were then freely irrigated with a 1 : 2000 bichloride solution; two large rubber drainage-tubes were then carried to the depth of the wound, and also a few strips of iodoform gauze were loosely packed into the wound, to secure additional drainage, and a gauze dressing was next applied. On the following day the temperature was normal and the patient was entirely relieved of pain. For some days, however, large sloughs escaped from the incisions, and, after the sloughs had escaped, the wounds were covered with healthy granulations, and the patient made a good recovery.

Mr. B., aged fifty-four years. This patient was also under the care of an irregular rectal specialist for hæmorrhoids, and was operated upon December, 1897. The treatment in this case, as far as could be ascertained, was probably an injection into the hæmorrhoids. On the day following the injection the patient suffered considerable pain in the region of the anus, which kept him from going to his business. He remained at home for a few days and suffered severe pain, and also developed a considerable amount of fever. Five days after the treatment he sent for his regular medical attendant, who feared the formation of an ischio-rectal abscess, and applied hot dressings, and on the following day made an incision into the indurated swollen tissues in the region of the anus, but no pus escaped.

On the next day, the seventh day after the original treatment, his condition was so unfavorable that Dr. Wharton was asked to see him with his physicians. His temperature at this time was 106° F., his pulse 140. The patient suffered intense pain in the region of the anus. The tissues in the region of the anus were swollen and indurated, the induration extending well out to the gluteal regions, and was so marked in the perineum as to cause the retention of the urine, and great difficulty in the introduction of the catheter.

The patient was etherized, and long curved incisions were made through the indurated tissue in the region of the anus, and these incisions exposed dark-colored, gangrenous, cellular tissue. The finger could be introduced through these incisions and passed completely around the rectal tube. The wounds were thoroughly irrigated with bichloride solution, and rubber tubes and gauze drains were introduced. The patient improved rapidly after the incisions were made, the temperature soon becoming normal. Large sloughs of cellular tissue were discharged from the wound for some time, but after several weeks the wounds were covered with healthy granulations, and the patient ultimately made a good recovery.

Gangrenous periproctitis is a much more common affection than complete gangrene of the rectum, but he had thought it worth while to report these two cases of this affection, from the fact that in both the disease developed shortly after some local treatment by irregular practitioners; that the patients were extremely ill at the time of the operation, and from the fact that the treatment by free incision apparently arrested the gangrenous process, and possibly saved the rectum itself from gangrene, and was followed in each case by satisfactory recovery.

He regretted that in these cases he did not have with him the means to have a culture made, so that the definite infection in each case could be ascertained. In the first case the rapidity of the gangrenous process, and the presence of air in the cellular tissue, as evidenced by crepitation, which could be well demonstrated, pointed to the possible infection of the tissues by the bacillus of malignant œdema, or more likely by the bacillus aërogenes capsulatus.

Dr. Oscar H. Allis said that sometimes only a partial gangrene takes place and the lateral portion is involved. He re-

membered a case, which was supposed to have had typhoid fever, in which a considerable portion of the lower end of the bowel was involved. The patient recovered with a one-sided scar about the lower third of the rectum, involving a lateral half of the sphincters. No trouble is experienced when the bowels are in good condition, but a diaper is necessary in case of diarrhœa.

He related the case of a girl, twenty years of age, who had suffered a great deal from inability to move the bowels, when examination revealed an intussusception within reach of the finger when inserted into the rectum. A soft catheter was passed through the constriction and relief obtained from the accumulation of gas.

He would like to know how low down intussusception could take place; for example, could it occur as low as the upper third of the rectum?

Dr. John Ashhurst, Jr., said he had never seen a case of gangrene of the rectum itself, but he had seen gangrenous inflammation of the tissues around the rectum, especially in connection with diabetes. He had also observed a similar condition in cases of neglected ischio-rectal abscess, and it may be a complication in advanced cases of granular degeneration of the kidney.

In reply to Dr. Allis's question, it may be said that even in ileo-cæcal intussusception the bowel may protrude from the anus, and that in the complete form of rectal prolapsus, met with in children, there is actually an invagination of the rectal walls.

Dr. R. H. Harte said that he had seen one typical case of gangrene of the rectum in consultation with a colleague at the Pennsylvania Hospital. Some error was made in giving an enema during which the man complained of intense pain. Six hours after the enema had been given the parts were enormously swollen far up into the bowel. The patient died in the course of a few weeks of peritonitis and was very much exhausted. He believed it was a case of gangrene of the rectum, although, maybe, not complete.

Dr. DeForest Willard said that after the injection of hæmorrhoids with carbolic acid many cases are followed by results similar to those related by Dr. Wharton. He was recently called out in the night to an old gentleman who had thus suffered at the hands of one of these quacks and found him moribund and

delirious. Almost the entire ischio-rectal fossa was in a gangrenous condition, and exuding from the anus was a very offensive fluid. He made a number of incisions, but the patient died before morning. He did not think surgeons could speak too positively about this matter when so many wonderful cures are falsely reported as following these injections.

He remembered a fatal case similar to Dr. Harte's, in which a woman had been given an injection into the rectum, and the point of a syringe had perforated the tube. The injection consisted of turpentine, and had been thrown into the abdominal cavity.

DR. WHARTON said, in rejoinder, that in both of his cases he made a rectal examination and satisfied himself that there was no intussusception.

He reported the cases of gangrenous periproctitis, because they had both been operated upon by unqualified practitioners, and in one the injection was of carbolic acid, while in the other stretching of the sphincter was resorted to. In treating hæmorrhoids by injection one great danger is sloughing of the rectum and tissues of the anus, which will give rise to a very troublesome stricture. A few years ago he saw a man who had received a carbolic injection for hæmorrhoids, and the whole tissues in the region of the anus seemed to have sloughed. Cicatrization occurred and so tight a stricture resulted that only the tip of the little finger could be admitted. He dissected out the cicatricial tissue, and found that the sphincter had not been destroyed, so he brought the mucous membrane down and stitched it to the skin, with a good result.

SEPARATION OF THE UPPER EPIPHYSIS OF THE HUMERUS.[1]

By HENRY R. WHARTON, M.D.

This accident may occur at any period of life from birth up to the twentieth year, and consists in a separation of the upper epiphysis of the humerus, comprising the head and tuberosities, from the diaphysis, and does not open the shoulder-joint; the line of separation being the line of the epiphysis, which begins at the axillary margin of the head of the bone and runs across it, slightly rising towards the centre in a direction almost horizontal, and ends at the outer side just below the position of the tuberosities, the line of separation in this injury closely approximating that observed in fracture of the anatomical neck of the humerus.

R. W. Smith ("Fractures and Dislocations," 1847), in describing this injury, says that the head of the bone can be felt in the glenoid cavity, and remains motionless when the shaft of the bone is rotated. The deformity is usually marked, and consists of a distinct prominence below the coracoid process, caused by the upper extremity of the lower fragment projecting in front of the shoulder-joint, and also the fragment being drawn inward and forward by the muscles passing from the chest to the humerus. Shortening is usually not marked, from the fact that the two surfaces are extensive, and are not entirely separated from each other.

It has been pointed out by Moore that the separated surfaces may preserve their normal relations to each other, and little deformity occur. This, in my experience, is unusual, and I think is most likely to be the case in very young subjects.

Moore has observed that the displacement is not usually complete, but that the upper end of the lower fragment is carried inward to a distance of about one-quarter of its diameter, when it is arrested by the convexity of the lower fragment becoming lodged in the natural concavity in the upper fragment, caused by the epiphyseal line; the upper fragment now becomes tilted by the action of the muscles, its internal margin ascending into the glenoid cavity, and its outer margin descending until it is arrested by the capsule.

This accident is most likely to be confounded with dislocation of the shoulder, but a mistake is not likely to occur if one observes that the shoulder-joint is not rigid, and that the arm hangs close to the side, and that the elbow is directed slightly backward and outward, and that there is a marked prominence of an inch and a half below and anterior to the acromion process. It should also be remembered that dislocation of the shoulder in children is an extremely rare accident. By manipulation crepitus can also often be obtained.

The reduction of the deformity, although it is considered by Moore not to be difficult, is, I think, usually a matter of the greatest difficulty. I have attempted it under ether without marked success, and where I have been able to bring about its reduction, it has often reappeared after the reducing force was withdrawn. R. W. Smith states that there is no fracture of the upper extremity in which it is more difficult to retain the fragments in their relative positions. Moore, in bringing about reduction, recommends that the arm be carried forward and upward in a perpendicular line; the upper fragment, or epiphysis, will remain fixed, being held fast by the capsule inserted into the outer and posterior margins of the head of the bone, while the lower fragment, or diaphysis, aided by the natural action of the muscles, will move outward and resume its original position. I am free to confess that, although I have seen the deformity diminish under this manipulation, I have not been able to completely reduce it to my satisfaction in cases where the deformity was marked before the manipulations were attempted.

In spite of the fact that it is often impossible to bring about complete reduction of the deformity, the results of treatment are usually most satisfactory as regards the functional result. The treatment which is generally recommended, and which I have adopted in cases coming under my own observation, consists in attempting by manipulation to restore the fragments as nearly as possible to their normal position. The dressing, then, consists in applying a primary roller to the forearm and arm, from the tips of the fingers to the axilla. A wedge-shaped pad of oakum or lint is next placed between the arm and the chest, with its base in the

FIG. 1.—Deformity in separation of the upper epiphysis of the right humerus.

axilla. A shoulder-cap of binders' board is next moulded to the shoulder and outer surface of the arm, extending to a point a short distance above the condyles; this is padded and applied to the arm and shoulder, and secured by a bandage. The arm is next brought firmly against the side of the chest, and secured by circular turns of a bandage. The forearm is then supported in a sling, in which the forearm rests at the wrist. The dressing is practically that known as Ferguson's for fractures of the upper extremity of the humerus. The dressing is changed at intervals of two or three days, and all

dressing is usually dispensed with at the end of the third or fourth week, passive motion not being made until this time.

The functional result following this injury, as before stated, is usually very good, but it sometimes happens that non-union occurs, causing an unfavorable result, as in a case reported by Hamilton, and also that occasionally osteomye-

FIG. 2.—Separation of the upper epiphysis of the humerus.

litis may follow the injury, as in a case recorded by Esmarch, in which excision of the joint was resorted to.

Arrest of growth of the limb in length has also been pointed out as a possible result of epiphyseal separation from injury, and premature ossification of the cartilage of conjunction. Although this is a possible sequel of the injury, I do not think that it is a very common one, for the cases which

I have had under observation for several years show no difference in the length of the limbs on each side. I desire to place on record the following four cases of this injury:

CASE I.—C. McC., aged sixteen years, in the month of March, 1896, fell from the roof of a porch, about fourteen feet in height, striking upon the right shoulder. Upon examination, I found he had sustained a separation of the upper epiphysis of the right humerus. A photograph, taken shortly after the accident (Fig. 1), shows the characteristic deformity of this in-

FIG. 3.—Skiagraph of case shown in Fig. 2, one year after the injury.

jury, and a skiagraph taken at the same time (Fig. 2) shows the position of the fragments. The patient recovered with a good functional result, and a skiagraph taken a year after the accident (Fig. 3) shows that the space between the fragments has been filled up by callus. Motion at the shoulder-joint at this time being almost perfect.

CASE II.—J. B., a boy, aged ten years, during July, 1897, fell from a fence six feet in height, and struck upon his left shoulder, sustaining a separation of the upper epiphysis of the humerus. A skiagraph (Fig. 4), taken immediately after the accident, shows the typical deformity. This patient recovered with little deformity, and complete motion at the shoulder-joint.

CASE III.—E. C., aged nine years, received, in September, 1897, a fall, striking upon the right shoulder, and, on examination, I found she had sustained a separation of the upper epiphysis of the humerus. This patient recovered with a very useful arm.

FIG. 4.—Skiagraph of separation of the upper epiphysis of the humerus.

CASE IV.—E. M., aged thirteen years, while playing football received a fall, striking upon the right shoulder. Examination showed the characteristic deformity of separation of the upper epiphysis of the humerus; a skiagraph, taken a short time afterwards, confirmed the diagnosis. This patient also recovered with almost complete function of the shoulder-joint.