STATED MEETING, MONDAY EVENING, OCTOBER 5, 1914.

The President, Dr. John H. Gibbon, in the Chair

MOWING MACHINE CUT OF LEGS

Dr. Edward B. Hodge presented a boy of three and a half years whose right leg had been nearly severed by the blade of a mowing machine. Both bones and the anterior tibial vessels and nerve, with the extensor muscles, were entirely divided. There was some laceration of the calf muscles next to the bones, but the posterior tibial vessels were not injured. Circulation in the foot was good. Under iodine sterilization the anterior tibial vessels were tied, the nerve sutured, and the ends of the divided muscles united as accurately as possible without unduly enlarging the incision and prolonging the operation. The child had lost much blood. The wound was dressed in a fracture box without drainage. Healing took place with slight discharge of serum, but no infection, and the boy has a perfectly useful leg. There is slight toe-drop and later it is probable that some further work will be needed on the muscles. There is a slight amount of sensation on the dorsum of the foot.

SARCOMA OF TONSIL

Dr. Ginsburg presented a man who had developed a growth in the right tonsil, the condition dating back to April of the present year. He had operated upon it in two stages; in the first operation, he removed the anterior palatine arch and the tonsil. Three weeks later, he made a dissection of the neck, removing the right submaxillary salivary gland, and all visible lymphoid tissue, finally ligating the external carotid artery at the bifurcation of the common carotid. A rapid recurrence has followed, and at present he is receiving daily treatments with radium, holding the tube containing the radium in his mouth for five hours at each sitting. Thus far he has received six radium treatments, and there is evidence of beginning resolution of the pathological overgrowth. The diagnosis is sarcoma of the right tonsil.

THE MORTALITY STATISTICS OF TWO HUNDRED AND SEVENTY-SIX CASES OF ACUTE INTESTINAL OBSTRUCTION

By John B. Deaver, M.D.
and
George G. Ross, M.D.
of Philadelphia

This study of the mortality statistics of intestinal obstruction is based upon a series of 276 consecutive cases of acute intestinal obstruction admitted to the German Hospital in the ten years ending with 1913. Some of the earlier histories were far from complete, and we have therefore used only those facts which could be found in practically all of the histories.

The etiology of the cases was as follows:

Post-operative adhesions		81 cases
Post-inflammatory adhesions		16 cases
Strangulated hernia		156 cases
Inguinal	77	
Femoral	50	
Umbilical	21	
Ventral	7	
Subdiaphragmatic	1	
Carcinoma of sigmoid		8 cases
Volvulus		5 cases
Fecal impaction		3 cases
Intussusception		2 cases
Adynamic ileus		2 cases
Congenital bands		1 case
Cause unknown or not recorded		2 cases

Of the 276 cases, 158 recovered and 118 died—a mortality of 42 per cent. One case is reported as improved, possibly one of the rare instances of spontaneous recovery or a mistaken diagnosis. The case noted as unimproved on the records probably declined operation and insisted upon discharge from the hospital.

A mortality of 42 per cent. in a large series of cases of acute intestinal obstruction is not an unusually high one. It is far higher than it should be, but an analysis of the records will easily disclose very definite reasons for such an unsatisfactory state of affairs.

In 241 cases we found adequate records of the average time from the onset of the condition to the time of operation. In the cases that

recovered it was 61.7 hours or over 2½ days, and in the case that died, 97 hours or 4 days and 1 hour. Under such conditions it is to be wondered at that so many cases had a fortunate outcome.

There is no doubt that in practically every instance, taking similar classes of cases, the time elapsing between the onset of the obstruction and the operation is the vital factor. Coley (*Keen's Surgery,* vol. iv, p. 50) states that in the first 24 hours the mortality in strangulated hernia should not be over 10 per cent.; in 72 hours it becomes 50 per cent. Naunyn (*Ibid.,* p. 645), in an analysis of 288 cases of ileus, states that recoveries within 48 hours were 75 per cent., but on the third day only 35 to 40 per cent. recovered. Pilcher (*Medical News,* 1902) reports 40 cases of acute intestinal obstruction due to gall-stones with a mortality of 52.5 per cent.

Da Costa (*Modern Surgery,* p. 976) states that mortality in acute intestinal obstruction is 60 to 70 per cent. and states also that prompt diagnosis and operation would much reduce this.

Ruge (*Archiv. f. klin. Chir.,* 1910–1911, xciv, pp. 711–760), in a report of Korte's Hospital cases of obstruction following appendicitis, reports a mortality of 50 per cent. in early obstruction, *i.e.,* immediately following upon the inflammatory process, and 45.8 per cent. in cases due to late or old adhesions. He reports in all 44 cases. J. V. Brown (*Surg., Gynec. and Obst.,* 1911, xii, p. 186) reaches the same conclusions as to the unnecessarily late operations in acute intestinal obstruction in a study of 59 cases in his experience. The only author whose experience seems not entirely to coincide with these facts is Woolsey (*Trans. Amer. Surg. Assoc.,* 1910, xxviii, p. 270), who in 26 cases of acute intestinal obstruction found that the average duration of the illness before operation had been rather less in the nine fatal cases than in the seventeen which recovered.

A more detailed analysis of the different groups of cases brings to light certain definite features concerning each group.

As to sex, our cases were divided fairly evenly, 144, or 52 per cent., being females, and 134, or 48 per cent., being males. Evidently complications arising from disease of the female pelvic organs slightly overbalanced the more frequent occurrence of hernia and disease of the appendix in the male.

Of special groups as regards etiology we find that hernias and post-operative and post-inflammatory adhesions furnish 253 of the 276 cases of obstruction.

There were in all 156 cases of strangulated hernia, or 56.4 per cent. of the total.

These were subdivided as follows:

Strangulated inguinal hernia	77
Strangulated femoral hernia	50
Strangulated umbilical hernia	21
Strangulated ventral hernia	7
Strangulated subdiaphragmatic	1

Of the 77 strangulated inguinal hernias, 57, or 74 per cent., recovered, and 20, or 26 per cent., died. Of the 50 cases of strangulated femoral hernia, 36, or 72 per cent., recovered, and 12, or 24 per cent., died. One was noted as improved, possibly spontaneous recovery or reduction; and one is noted as unimproved.

Of the 21 cases of strangulated umbilical hernia, 12 recovered and 9 died, or 42 per cent. Of the seven ventral or incisional hernias, 4 recovered and 3 died, or 42 per cent.

The higher mortality in the umbilical and ventral hernias is accounted for by the frequently observed fact that acute symptoms are often delayed and of lesser severity than in the inguinal and femoral hernias, and the indications for operations not quite as early and definite as in the other varieties of hernia.

Nevertheless, such a mortality in strangulated hernias is appalling. It is true that the average operation for an early strangulated hernia of any of the ordinary varieties does not offer great technical difficulties nor should it be attended by great mortality. The explanation is again to be found in delay before operation. It is our practice at the German Hospital to operate strangulated hernias as soon as possible after admission; the delay, therefore, as in all cases of obstruction admitted to hospitals, is before the admission of the patient. In some few instances the patient may be slow to consult a physician, but generally this is not the case.

In hernia especially the physician has a clue and guide to the cause of the symptoms in the very existence of the hernia. Oversight must be rare, except, possibly, in instances of Richter's hernia. But the hernia, while plainly indicating the source of trouble, also opens the way for delay in the operative treatment of the obstruction by giving an opportunity for an attempt to correct the condition by taxis and manipulation.

Coley gives five minutes as a safe length of time to employ taxis. Many indeed of our cases at the German Hospital have, before admission, been subjected to manipulations, often severe and inexpert, extending over many hours and even repeated upon successive days.

When we consider the dangers and difficulties of taxis in strangulated hernia and bear in mind the fact that manipulation has been resorted to in practically every case before its admission to the hospital, we are justified in making it our practice to operate at once upon every strangulated hernia regardless of any other considerations. When ether or chloroform anæsthesia are not safe, local anæsthesia, and in rare cases spinal anæsthesia, will enable us to overcome this difficulty.

Although in our statistics we coincide with Coley in stating that the highest mortality in strangulated hernias is in the umbilical and ventral, our mortality in strangulated inguinal hernias (26 per cent.) was slightly higher than that of the femoral (24 per cent.), the reverse of what this author states. We are also able to substantiate his statement that the mortality is in large hernias and when the sac contains adherent omentum, and we believe that these two factors common to umbilical hernias are important in contributing to the high operative mortality in these cases.

Next to hernia in number are post-operative adhesions, there being in our series 81 cases, or 29 per cent., of the total number. Of the 81 cases, 41 recovered and 40 died, a mortality of 49.3 per cent. This mortality also is high and can only be accounted for by the long average time elapsing between the onset of the disease and operation. While the symptoms of strangulation of a femoral or inguinal hernia are fairly well known to the physician, it would seem that in other cases of intestinal obstruction terminal symptoms only are recognized. It is true that usually a case of obstruction has been diagnosed as colic, acute gastritis, or enteritis, and that a diagnosis of intestinal obstruction is not made until we begin to have the symptoms of toxæmia, peritoneal inflammation and persistent vomiting, often fecal.

In a small percentage of the cases the obstruction occurred during convalescence and while the patient was still in the hospital, when the diagnosis could be made early and treatment promptly instituted. The average time from the first operation to the obstruction was two years and three months. The longest period intervening was twenty years (following a hysterectomy).

Of the 81 cases of post-operative adhesions, 51 followed operations for appendicitis and 44 of this series had had drainage at the original appendiceal operation. Each drainage case can safely be held to mean a case in which operation was delayed beyond the time of election. In line with endeavors to prevent instead of treating avoidable surgical conditions, nothing is more important than to forestall the development of pus within the peritoneal cavity. Of the 51 cases, 27 died. A large

percentage at least of these patients would never have had adhesions or the consequent obstruction had they been operated upon early in the appendiceal attack and had drainage not been necessary.

Seventeen cases are stated to have been due to post-operative adhesions, the primary cause not being given.

Fourteen followed operations upon the female pelvic organs, hysterectomies, salpingo-oöphorectomies, etc. A certain number of such cases are now doubtless avoided by the greater care exercised in covering raw surfaces, stumps, etc.

Post-inflammatory adhesions were 16 in number. The term is used to designate new adhesions from an inflammatory or peritonitic process. Of these 11 died, a mortality of 68.7 per cent. This is partly due to the weakened and septic condition of the patients at the time of operation and partly due to the difficulty of diagnosis. Our results must always be in question in these cases. Our only hope is in minimizing the cases of peritonitis and of resulting obstruction. Most of such cases occur after operation for appendicitis in its later stages.

A more difficult post-operative condition to explain is adynamic ileus, of which there were 2 cases, one recovering and one dying. In the absence of a septic cause excessive handling of the viscera may be held to account for it. A more probable explanation is the occurrence of a thrombosis of the mesenteric veins.

There were three cases of fecal impaction with two deaths, a mortality of 66⅔ per cent. Fecal impaction generally occurs in elderly people and often much time elapses before operation. The onset and course are more or less insidious and the patients have usually been treated vigorously by purges, starvation, enemata, etc. Moreover, operative intervention very occasionally leads to enterostomy and colostomy, and this in itself is an unfavorable factor. One case of acute obstruction is recorded as having been caused by congenital bands. Of late years so-called "congenital" bands have received an increasing amount of attention. We believe that bands of extent great enough to produce obstruction are rarely congenital—that they are practically always due to subacute or unrecognized attacks of peritonitis.

There were five cases of volvulus, of which three recovered and two died, or 40 per cent. This is a condition not very frequent and generally not definitely diagnosed before operation. The sudden onset and rapid development of symptoms, however, are always sufficient to make clear the fact that some abdominal catastrophe demanding surgical intervention has occurred.

The same is true of intussuception in adults, of which there were

two cases in this series; one recovered and one died. The case which recovered was a most interesting one. The intussusception occurred during typhoid fever, was correctly diagnosed and promptly operated. It has been elsewhere reported by one of us in conjunction with Dr. H. F. Page (*Amer. Jour. Med. Sci.*, December, 1907).

There were eight cases of acute obstruction complicating carcinoma of the sigmoid. It is not to be expected that in such cases recovery could occur.

Taken as a whole, numbers of cases in which adequate records were kept show certain interesting points in symptomatology. In 63 cases, from 1908 to 1912 inclusive, with records of the vomiting, there were 35 recoveries and 28 deaths. In the cases recovering 5 only had reached the stage of fecal vomiting, but the average length of time the patients had been vomiting was two days and one hour. Of the 28 cases dying, 14 had fecal vomiting and 14 non-fecal vomiting only. The average duration of the vomiting had been two days and sixteen hours.

It would seem almost impossible that a patient with persistent uncontrollable vomiting with other symptoms of obstruction should be allowed to continue ill for over two days without a diagnosis or appropriate treatment.

In ninety cases, 1908 to 1912 inclusive, in which a record was kept of the fecal evacuations, 52 were cases that recovered and 38 died. In the recovered cases bowel movements had been absent on an average for two days and twelve hours and in those that died, three days and five hours. These figures point, as do the previous ones, to inexcusable delay, for in practically every case vigorous means had been adopted to produce an emptying of the bowel. Here we may well sound a note of warning against misinterpreting evacuations of the lower bowel only as a result of enemata, especially when the colonic contents are emptied by a high enema.

A review of the entire mass of statistics upon this series of cases makes it evident that in almost every instance, in spite of symptoms so plain as to be pathognomonic, diagnosis has been tardy and operation delayed. Prompt diagnosis and immediate operation will reduce the mortality in acute intestinal obstruction to a mere fraction of that encountered at present.

Dr. Charles H. Frazier said that one of the most important life-saving factors in the management of cases of intestinal obstruction is the avoidance of a general anæsthetic, particularly ether. These patients are intensely toxic and do not stand an anæsthetic well. The greater part

of the operation can almost always be conducted under a local anæsthetic, and at most a few whiffs of nitrous oxide may be required to allay pain.

Dr. John H. Gibbon said that there are two elements in the mortality of strangulated hernia or intestinal obstruction: One is the anæsthetic, already mentioned by the authors and in discussion. General anæsthesia should be avoided whenever possible, in the hernia cases especially. If a general anæsthetic is used, it should be as short a period of general anæsthesia as possible. Not only because of the bad effect of the anæsthetic upon the patient, but because the man who is operating under a general anæsthetic is tempted to do a great deal more than if operating with a local anæsthetic. It is trying to complete an operation that often results in the death of these patients. This is particularly true in regard to colonic obstruction. When the patient is anæsthetized it is easy to make the mistake of trying to do too much instead of simply trying to relieve the obstruction, and doing the radical operation at a later stage.

Another point is that of post-operative obstruction—a condition the frequency of which has greatly diminished in recent years. This difference is due to the fact that we are not packing abdomens full of gauze, and that drains are covered with rubber to prevent adhesions.

Dr. Ross, in closing, said that the technic carried out is a very simple one. As a rule, a general anæsthetic is used; infrequently, a local anæsthetic. The anæsthetic is given to the degree that obstetricians give it, enough to dull the patient's sensibilities. The abdomen is rapidly opened with a liberal incision and evisceration done at once. No attempt is made to locate the obstruction. The entire small bowel is delivered and laid upon a wet towel. At once the obstruction comes into view and it is dealt with according to the condition of the bowel and condition of the patient. If the patient is profoundly toxic, enterostomy is done and the wound sewed up. If the patient's condition warrants it, resection is attempted when the bowel is badly damaged, but as a rule the intestines are put back at once, salt solution used, drainage instituted, and the wound sewed up. Paul's tubes we rarely use to drain the bowel. Occasionally, but rarely, the bowel is fastened to the anterior abdominal wall for the purpose of permanent drainage.

Post-operative adhesions are diminishing in frequency. It used to be, five, six or seven years ago, that one patient out of eleven coming to the German Hospital with appendiceal abscess and drained with the method employed at that time, of large folds of iodoform gauze, had

post-operative obstruction. This is not so to-day, because a different method is used. Rubber tissue is used to protect the capillary drains and prevents adhesions.

TRAUMATIC RUPTURE OF THE DEEP URETHRA

Dr. George G. Ross presented a boy, aged eleven, who was run over by a heavy wagon, the wheels passing diagonally over the right lower abdomen, pelvis and left hip, at 7.30 P.M., April 21, 1914.

On admission the boy was shocked and in great pain; temperature remained subnormal until the following morning. Pulse was weak and thready and rose to 144 by the following noon. Examination revealed a bruised abdomen and hip, and in addition a fracture of the left tibia in the upper third. The patient's chief complaint was rectal pain. No urine was voided from 7.30 P.M. until the following day. Shortly before noon the day after the accident the patient was catheterized. Before this had been done some blood was noted at the meatus. The first use of the catheter brought a few drops of blood and later one-half ounce of bloody urine. There was great abdominal and perineal tenderness and swelling in the perineum. At 2.15 P.M., on April 22, hypodermoclysis was given and strychnine ordered. Dr. Ross saw the patient at 4 P.M. and concluded that operation was inadvisable because of the patient's general condition.

In the next few days the abdominal rigidity lessened and catheterization was possible. A retention catheter could not be employed because of the discomfort caused. The patient's general condition improved, the pulse, however, remaining very weak and there being always much abdominal pain and tenderness. An X-ray showed a fracture of the descending ramus of the left pubic bone. The patient began to void urine fairly well four or five days after the accident, often involuntarily, and had involuntary bowel movements.

On April 27, the sixth day, he became very restless and began to run a septic temperature. Examination revealed a lower abdominal resistance with tenderness suggesting urinary extravasation, and operation was decided upon. On April 28, 1914, one week after the accident, a suprapubic incision was made and the space of Retzius opened. A large quantity of ammoniacal urine was evacuated. The broken portion of the pubis could be easily felt, but evidently had sprung back partly into place. A catheter (silver) introduced showed its tip through a rent in the bladder just at the site of the urethral junction—or the site of the urethral avulsion—and could not be introduced into the bladder proper. Drainage tubes were introduced and allowed to remain a number of days. The temperature was septic for a week, and mildly febrile for a week, and then from the third to sixth week septic, but not severely so. All urine came through the suprapubic wound. Several attempts at catheterization were failures. On May 27 a deep gluteal abscess was opened by his assistant, Dr. Mencke. It was a hard abscess with little pus that had been extremely painful and evidently caused by deeply burrowing urine. The suprapubic wound showed great tendency to close and the discharge of urine was impeded. This gave the patient great pain. The incision was again enlarged on May 27, but an attempt to pass the catheter was unsuccessful.

Finally, these closures exhausted the patient so much that on June 9 under ether anæsthesia he attempted catheterization, and was successful in introducing first a silver catheter and then a 10 English woven catheter, which was sewn in and remained five days. The suprapubic incision was cleaned of old granulations. The former bladder rent was not felt. The catheter remained in five days and since then the patient voids naturally. No urine has come out above since the last operation.

Dr. Gwilym G. Davis said that, in cases of rupture of the urethra in the membranous portion or in close connection with the bladder, difficulty is often experienced, as in this case, of passing the catheter into the bladder. Some years ago he was visiting in the country and he was asked to see a man who had sustained a rupture of the urethra from falling astride a board. There was no external wound at all, and the endeavor to introduce a catheter by the usual method was a failure. He therefore injected warm water into the urethra through the meatus, which distended the urethra and also the parts at the site of the injury. He then took up a large metallic catheter and with ease passed it across the broken part into the bladder. He suggested the method as worthy of trial in such cases.

COMPLETE FRACTURE OF THE LOWER THIRD OF THE RADIUS IN CHILDHOOD, WITH GREENSTICK FRACTURE OF THE ULNA

By Penn G. Skillern, Jr., M.D.
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instructor in anatomy and surgery, university of pennsylvania

While fractures of both bones of the forearm in childhood are frequent and well-recognized, there is one variety that, in its mechanism, site, and characteristics, is as definite a clinical entity as is Colles's fracture, and yet it has not been differentiated in the text-books or in the literature from the other indifferent fractures of the forearm. I refer to complete fracture of the radius with incomplete greenstick fracture of the ulna in the lower third of their shafts (Fig. 1). The cause is quite constantly a fall *while in motion,* most commonly either off skates or a bicycle. The deformity consists of displacement of the lower fragment of the radius to the dorsum and laterally, and bending of the ulna with concavity toward the radius, the radial portion of the fibres of the ulna at its site of fracture being compressed but not torn asunder, the inner fibres only being separated. I shall endeavor to show that about this peculiar and characteristic incomplete greenstick fracture of the ulna hinges the maintenance of the displacement, and also the correct method of reduction. The following two cases are typical:

Case I.—H. H., male, aged fourteen years, school-boy, white, presented at the Surgical Out-patient Department of the University Hospital (Case record 40,201) on April 2, 1914, with the history of having fallen two days previously, *while skating,* upon the outstretched right forearm.

Clinical Diagnosis.—Fracture of radius and ulna shafts, lower thirds, that of the radius being complete and with displacement, and that of the ulna being incomplete and with diminution of the normal external concave curve. Skiagram showed for the radius in the anteroposterior view a transverse dentate line of fracture 1⅛ inches above the epiphyseal cartilage, with lateral shifting of the distal fragment, one-third diameter; and in the lateral view, displacement of the same fragment dorsally, two-thirds diameter; and for the ulna a transverse greenstick line *incomplete externally,* at a higher level (⅞ inch) than that of the radius, and with bowing of the ulna concave externally (Figs. 1 and 2).

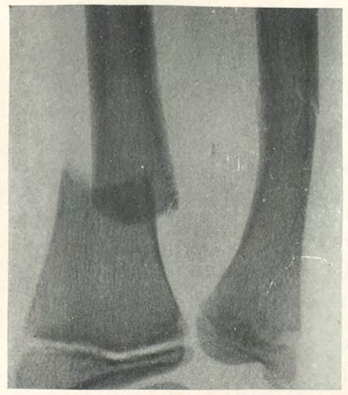

Fig. 1.—Type of "special" fracture of radius and ulna (anteroposterior view). The radius is involved by a transverse dentate line, 1⅛ inches above the epiphyseal cartilage. The distal fragment is shifted laterally, one-third diameter. The ulna is involved by a transverse greenstick line, incomplete externally, at a higher level (¾ inch) than that of the radius, and with bowing concave externally. See Case I.

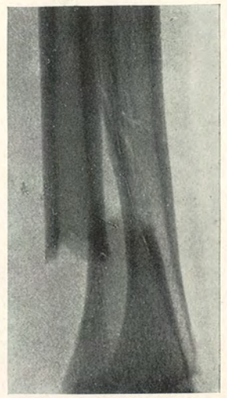

Fig. 2.—Lateral view of radius and ulna in Case I. The distal fragment of the radius is displaced dorsally, two-thirds diameter. There is slight dorsal displacement of the ulna.

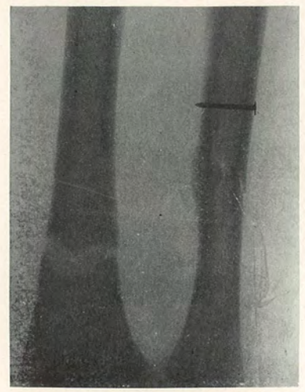

Fig. 3.—After reduction (anteroposterior view). Note complete rupture of outer fibres of ulnar fracture, with consequent straightening of inner border of ulna and automatic shifting of displaced distal fragment of radius into good position. Compare with Fig. 1.

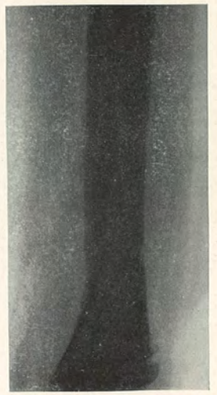

Fig. 4.—After reduction (lateral view). Fragments reduced to their normal position. Compare with Fig. 2.

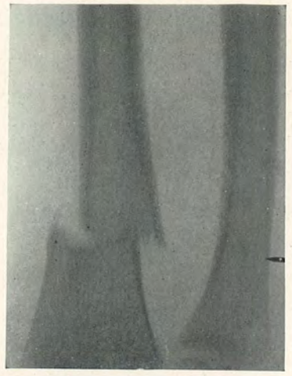

FIG. 5.—A second typical case of "special" fracture of radius and ulna (anteroposterior view). The description corresponds to that of Fig. 1, although both bones are fractured at a more distal (⅛ inch) level. By placing a ruler along the inner border of the ulna the outward bowing of this bone, distal to the seat of fracture, is accentuated. See Case II.

FIG. 6.—Lateral view of radius and ulna in Case II. Note dorsal displacement of distal fragment of radius, ½ diameter, with greater angulation than in Fig. 2. No displacement of ulna.

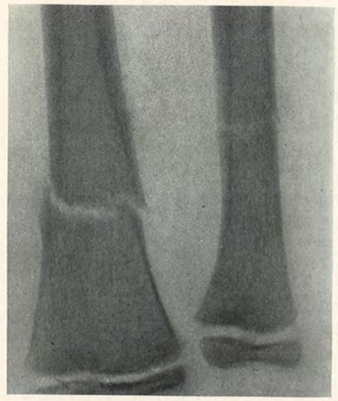

FIG. 7.—After reduction; anteroposterior view. Again the outer fibres of the ulnar fracture have been completely ruptured with the result that the alignment of the inner border of the ulna has been restored and the displaced radial fragment shifted into place. Restoration of alignment of inner border of ulna may be demonstrated by a ruler. Compare with Fig. 5.

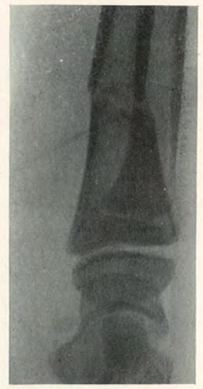

FIG. 8.—After reduction; lateral view. Distal fragment of radius still angulates slightly backward, but this was corrected with ease at the next dressing. Compare with Fig. 6.

A study of this fracture in the skiagram not only reveals the mechanism of production, but also furnishes a clue to the mechanism of reduction. The deformity leads one to anticipate difficulties in complete reduction, but it is very simple. In the first instance, it is evident that the brunt of the vulnerating force was borne by the radius, whose fracture is complete, and that there was sufficient force remaining to produce the greenstick fracture of the ulna. The inner fibres of the ulna were ruptured by tensile stress, whilst the outer fibres underwent compressive stress, the force thus stopping short of causing a complete fracture of this bone. *These intact outer fibres of the ulna maintained the position the bones were in when the force ceased to act, and therefore presented the chief obstacle to reduction.* It is patent that *in order to reduce the fracture, attention must be directed chiefly toward overcoming the vicious bowing of the ulna, and that this can be accomplished only by rupturing the still intact outer fibres,* so that alignment of the inner border of the ulna may be restored, which means conversion of the greenstick into a complete fracture. This having been done, *the radial fragments, aided by a little pressure, will reduce themselves automatically.* Acting upon this analysis of the fracture, the complete reduction of the fragments, as shown in the second skiagram (Figs. 3 and 4), was attained. The criterion of reduction, then, must be the restoration of the alignment of the inner border of the ulna.

CASE II.—H. M., male, aged thirteen years, school-boy, white, presented at the Surgical Out-patient Department of the Hospital of the University of Pennsylvania (Case Record 41,221) on July 22, 1914, with the history of having tripped five days previously down three steps, turning a somersault, and landing upon right forearm.

Clinical Diagnosis.—Complete fracture in lower third of radius with displacement, and greenstick fracture of ulna at a slightly higher level. Skiagram showed for the radius in the anteroposterior view (Fig. 5) a transverse dentate line one inch above the epiphyseal cartilage, with displacement of upper end of distal fragment laterally, one-third diameter, and in the lateral view (Fig. 6) displacement of upper end of distal fragment dorsally one-half diameter. The ulna showed in the anteroposterior view a transverse greenstick line 1½ inches above the epiphyseal cartilage, *incomplete externally,* and slight bowing of distal fragment with concavity toward radius. In the lateral view there is no displacement.

Under nitrous oxide gas anæsthesia the greenstick fracture of the ulna was made complete, the outer, unbroken fibres rupturing

with an audible snap. The fragments of the radius adjusted themselves automatically into place. Two splints were applied, a volar bond and a dorsal straight, and the forearm was placed in a triangular sling. Skiagram (Figs. 7 and 8) showed that reduction was complete, *the alignment of the inner border of the ulna having been restored.*

This case was so similar to the first case in the mechanism of production, the findings, and the mechanism of reduction, that I looked over our records to gauge its frequency. A study of these previous cases, together with a closer investigation of cases reporting subsequently forced me to the conclusion that here *we are dealing with a fracture fully as characteristic and significant as Colles's fracture in adults.* In other words, this fracture is to childhood what Colles's fracture is to adults. Colles's fracture is comparatively rare in childhood, having been found in but four per cent. of cases in this series, and occurs at an older age than fracture of both bones in their lower third.

Malgaigne recognized that greenstick fractures are more common in the forearm than elsewhere, and are usually due to a fall upon the hand. The importance of reduction is exceptionally great, not only from the stand-point of epiphyseal growth, but also from that of rotation of the radius, which may be easily destroyed by displacement or non-union. The teaching that a bad anatomical result does not always imply a bad functional result is baneful, for it furnishes an excuse to be satisfied with inferior anatomical reduction. On the contrary, the idea expressed by Mr. Robert Jones, of Liverpool, that a bad anatomical result gives good functioning in only 29.7 per cent., but that a good anatomical result gives good functioning in *90.7 per cent.* of cases, is to be endorsed. The same authority also advises that, in addition, the bones be restored to their normal curve. Despite these strong arguments in favor of completing incomplete fractures so as to restore proper alignment, there are some, Cotton among others, who consider it unnecessary, and that it makes it harder to maintain the fragments in the correct position. To this there may be added the theoretical objection that the periosteum might be ruptured or torn up, and that osteoblasts might grow along the blood clot out into the muscles, produce exuberant callus, and subsequently interfere with function. These objections may be met with the observations that many fractures are complete from the beginning, and often show considerable displacement, as in the radius in my case, yet healing without exuberant callus results; that in childhood the periosteum is thicker and tougher than in adults, and hence less liable to be torn; and that, when properly reduced, it is not hard to maintain the fragments in the correct position—not even so hard as when the fractures are complete from the beginning, since the grip of the greenstick fracture, together with the unruptured periosteum, tends to prevent wide excursion of the fragments from each other during reduction. Of course, in fractures as well as in luxations, it is inadvisable to use an undue amount of force in the act of reduction, for extensive damage might be done.

Analysis of Cases.—One hundred cases of fractures of the radius and ulna in childhood in which the histories were carefully kept were selected from the records of the Surgical Out-patient Department of the University Hospital between January 1, 1912, and September 1, 1914, and afford a fairly rich assortment for study.

Season.—Sixty per cent. occurred in the summer months, from May to August, inclusive. In the Spring, bicycles, skating and running become popular. In June and July young human beings revert to the type of their arboreal ancestors coincident with the appearance of luscious cherries upon trees. With the opening of public playgrounds falls from swings furnish many cases. Twenty per cent. occurred in each of the remaining periods of four months, sledding being a contributory factor.

TABLE I

TABLE SHOWING FREQUENCY ACCORDING TO MONTHS AND SEASONS

January	3	May	10	September	8
February	6	June	10	October	6
March	5	July	28	November	4
April	6	August	12	December	2
Total	20		60		20

Age.—More than two-thirds occurred from nine to fourteen years of age, inclusive. This is the period of greatest and roughest activity in childhood. Both bones and the ulna alone were broken in younger children, while fractures of the radius alone or disjunction of its lower epiphysis occurred on an average in older ones.

TABLE II

TABLE SHOWING FREQUENCY ACCORDING TO AGES

2	1	9	13	15	4
3	3	10	7	16	3
4	3	11	11	17	4
5	1	12	13	18	0
6	5	13	11	19	1
7	4	14	14		
8	2				
Total	19		69		12

Sex.—Four-fifths of the cases occurred in boys, in keeping with their rougher methods of play.

TABLE III

TABLE SHOWING FREQUENCY ACCORDING TO SEX

Males	81
Females	19

Cause.—Fractures of the upper extremity in general and the forearm in particular are the penalty of the erect attitude, and of atrophy of the prehensile function of the forelimb. It seems best to distinguish two classes of falls, those with which momentum is strongly associated, and those in which it is an insignificant factor, the attraction of gravity predominating. In the latter class falls from a height may be given special prominence. A study of these cases shows that the special fracture of the lower third of the radius and ulna, the basis of this paper, is particularly associated with the momentum gained by bicycling, skating, swinging, running, horseback-riding, motoring, and pole-vaulting. Those in which the force is more purely the attraction of gravity are falls from steps, porch or fence rail, chair, bed, high-jump, or merely slipping and falling upon hyperextended, less often hyperflexed, hand. Falls from a height include those from a tree, pole, ladder, or haystack.

Site.—As in adults, the lower third of the radius is most frequently fractured. In this series the lower third of both bones or of the radius alone comprised 70 per cent. of the fractures. This circumstance and the fact that the radius in childhood is usually fractured above Colles's site (which is usually taken at from one to one and one-half inches above the lower articular surface of the bone) may be explained in part by the statement of Rixford (*Jour. A. M. A.*, 1913, lxi, 916), that in the long bones of children the medullary canal is smaller than in adults and is especially undeveloped toward the ends, and that the compact bone of the shaft becomes thin much farther from the ends than in adult bones and the cancellous bone extends correspondingly farther from the epiphyses. The following table has been compiled to show the mechanism according to the site of fracture.

The most significant feature of this table is the frequency with which the radius and ulna are both fractured in their lower third, this site being involved in 32, or almost one-third of the cases. Of these 32 cases, thirteen, or almost 50 per cent., conform to the type to which special attention is called in this paper, namely, complete fracture of the lower third of the radius with dorsal and lateral displacement and green-stick fracture of the ulna incomplete on its radial side and with bowing

TABLE IV

TABLE SHOWING MECHANISM ACCORDING TO SITE OF FRACTURE (See Figs. 9–13)

No. Cases	Site	Gravity Without Momentum	Gravity With Momentum	Falls From Height	Cause Not Given
4	Both bones, upper third	3	1	0	0
14	Both bones, middle third	7	6	0	1
32	Both bones, lower third	15	11	6	0
6	Radius, lower third, and ulna, styloid	2	2	0	2
3	Radius, upper third (neck 2, shaft 1)	2	0	0	1
3	Radius, middle third	1	2	0	0
16	Radius, lower third	9	4	2	1
16	Radius, disjunction of lower epiphysis, and fracture of ulna, styloid tip (2)	5	4	3	4
6	Ulna	4	1	1	0
100		48	31	12	9

of the lower fragment of the ulna over toward the radius, the displacement of whose lower fragment it thus maintains. In fact, *this special fracture comprises 13 per cent. of all fractures of the radius and ulna*

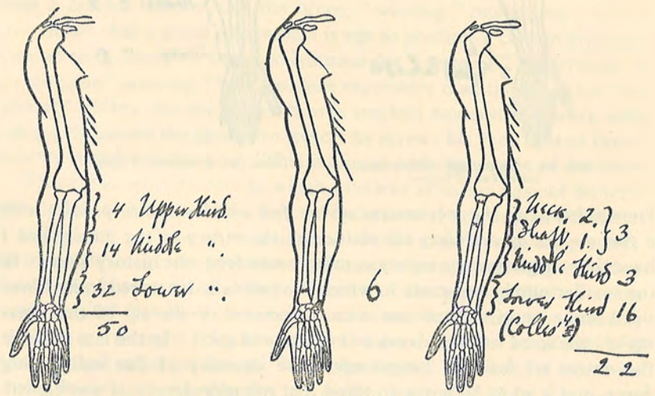

FIG. 9.—Fractures of radius and ulna (thirds).

FIG. 10.—Fracture of radius (lower third) and ulna (styloid process).

FIG. 11.—Fractures of radius (thirds).

in this series. Of these thirteen special fractures at least eight, or almost 66 per cent., were caused by gravity *with* momentum. In the remaining five the nature of the fall unfortunately is not stated in two, was direct

violence in two others, and a fall from a ten-foot ladder in the remaining case. Hence, it may be stated that this special fracture is typically *the resultant of the action of gravity with momentum.* A study of the non-typical fractures at this site shows in a general way that falls upon the hyperflexed hand are apt to result in " buckling " fracture of both bones, by which is meant telescoping of cancelli with bulging about the circumference of the fracture and without displacement; that falls upon the hyperextended hand are apt to result in ordinary greenstick fractures of both bones with angulation, and that falls from a height are apt to produce complete fractures of both bones with greater displacement.

FIG. 12.—Epiphyseal disjunction, lower end of radius.

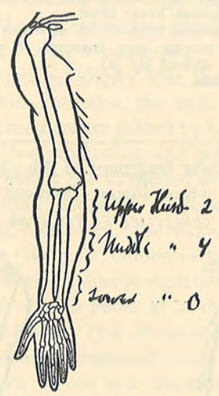

FIG. 13.—Fractures of ulna.

Hence, *knowing the mechanism of the fall enables one to predict with a fair degree of certainty the nature of the injury to the bones,* and I have thus diagnosed the injury in many cases from the history alone. In the smaller number of cases in which the radius is fractured in its lower third alone or in conjunction with separation of the tip of the ulnar styloid the same rules of cause and effect hold good. In the last analysis the extent of fracture hinges upon the intensity of the vulnerating force, and it must be borne in mind that minuter details of mechanism could be elicited if the observer were to see the patients actually falling.

In the sixteen cases of disjunction of the lower epiphysis of the radius all these mechanisms were exemplified. This injury occurs on an average at a later age than the fractures we have been discussing. It is diagnosed clinically by the site of the displacement, if any exist. There

may have been displacement which was reduced by the patient, in which case the history is of great diagnostic importance, and the skiagram being negative is really of positive value. In two of these cases the tip of the styloid process of the ulna was avulsed. There was one case of para-epiphyseal strain, in which injury the epiphysis is partially separated, and one of para-epiphyseal sprain, in which the epiphysis is completely separated but not displaced. These types of injuries conform with the well-known classification of Ollier, and may be diagnosed by the site of " wincing " tenderness, the absence of deformity or of history of deformity, and the skiagram, which shows a widening of the epiphysis, and later on callus formation about the site of injury. Epiphyseal injuries must always be suspected in children and adolescents and carefully reduced and treated just as a fracture, lest there arise deformity in the growth of the bone.

The diagnosis of an injury to the forearm should always be made by careful clinical investigation. It is a great mistake in more than one way to depend exclusively upon the skiagram. *A skiagram must be considered merely as one of the many signs of fracture.* There are two factors which will diagnose 90 per cent. of fractures of the forearm clinically. One is a thorough understanding of the mechanism obtained from a careful history, and the other, " wincing " tenderness. It has been shown that a given mechanism is apt to produce a certain fracture. This, in turn, indicates where to examine for " wincing " tenderness. I use the term " wincing " because more expressive than the adjective " localized." When the site of fracture is reached moderate pressure with a finger tip causes the patient to *wince:* he screws his face up and involuntarily withdraws his arm. This is almost pathognomonic of fracture.

There is another feature to which I believe attention has not hitherto been called. I have recently seen several cases of fracture in childhood in which I was positive of the existence of a fracture on clinical grounds, but in which skiagrams taken from all aspects were apparently negative. Not having been satisfied I decided to await the usual period of callus formation and then have other skiagrams taken, in the meantime treating the cases as fractures. In these several cases I had the satisfaction of seeing typical callus produced. In the first case I wondered if this were a traumatic osteoperiostitis, but my doubts were allayed by the second case, in which there was a complete fracture with callus in the lower third of the radius while the ulnar callus showed only along the radial border of this bone, at a location where it is obvious that traumatic osteoperiostitis could not occur, especially seeing that the injury was produced by indirect violence. Minute scrutiny of the skiagrams now

revealed a very faint transverse line, perhaps only a few torn cancelli, whose site corresponded exactly to that of the clinically-elicited " wincing " tenderness (Fig. 14). In interpreting this faint line defects in the plate were carefully excluded. I believe that here we are dealing with the first degree of a greenstick fracture—a degree attained by the vulnerating force ceasing to act after it had torn a few cancelli, whereas further action of this vulnerating force would have produced the typical bending greenstick fracture. These cases also emphasize the accuracy of " wincing " tenderness, and its value as an indicator of where to look on the skiagram for a fracture. I believe I present good reasons for considering a skiagram a secondary sign of fracture that is surpassed in value by a careful history and the eliciting of " wincing " tenderness.

I believe that fractures of the radius and ulna or of either alone in childhood are best treated according to the following plan. If reduction be indicated, nitrous oxide gas should be administered for reasons stated above. Attempts at reduction must be repeated until the skiagram shows a satisfactory result. The criterion of reduction of a Colles's fracture or an epiphyseal disjunction is the restoration of the carpal articular surface of the radius to a plane that lies at right angles with the long axis of the forearm. Splints of the proper size are fashioned for the individual case from stout pine board. It is my custom to have at hand for this purpose a stock of boards in lengths and a sharp carpenter's saw. The splints are well padded with non-absorbent cotton, which is retained by a muslin bandage secured by a pin. The padded splint is applied to the forearm and retained, not by plaster, but by a *muslin* bandage. In applying this bandage the first turns are the loosest and the final turns the tightest. The bandage is secured by pins or adhesive strips. The forearm is always bandaged at right angles to the upper arm, lest the upper edge of the bandage cut into the antecubital fossa. A triangular sling is then applied. For fractures of both bones in the upper two-thirds the mid-prone position is liable to result in sagging of the fragments toward the ulnar side, an undesirable circumstance that may be obviated by the position of full supination. The patient reports the next day to insure against ischæmic contracture, and the parent is directed to watch the circulation of the limb by noting the color, temperature, and occurrence of pain, and bring the child around immediately upon the appearance of these disturbances, for it is known that ischæmic contracture may develop within a very few hours. Massage and passive motion are prescribed for the individual case, and the splints removed as soon as firm union is present.

Conclusions.—(1) There is a fracture of the lower third of the

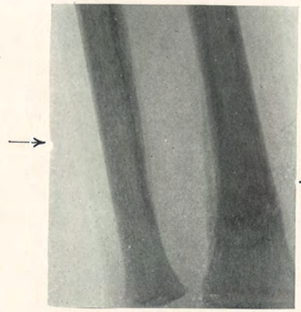

Fig. 14.—The method of diagnosing "first degree" greenstick fractures, patent clinically but obscure in skiagram, by awaiting callus formation. The radial border of the ulna, between the two arrows, shows a strip of callus formation, the lower arrow showing, on close scrutiny, a greenstick fracture. Note callus on radius. Skiagram taken 40 days after injury.

radius and ulna peculiar to childhood and which constitutes about 13 per cent. of fractures of the forearm. This fracture commonly occurs before the age of puberty, is most frequently encountered during the summer months, and is caused usually by the effects of gravity plus momentum. It is characterized by complete fracture of the radius with dorsal and lateral displacement of the lower fragment and by incomplete greenstick fracture of the inner half of the ulna, usually at a higher level, the outer half remaining intact and maintaining the deformity of the ulna, which is a bowing of the lower fragment toward the radial side and which, in turn, maintains the displacement of the distal fragment of the radius. In reducing this fracture the aim must be to convert the incomplete greenstick into a complete fracture by forcibly rupturing the still intact outer fibres, thereby enabling restoration of alignment of the distal fragment of the ulna with that of the axis of the bone, the distal fragment of the radius coincidentally shifting itself automatically into position. The criterion of reduction is the restoration of the normal alignment of the inner border of the ulna.

(2) Fracture of the lower third of both bones and of the radius alone comprise 70 per cent. of fractures of the forearm in childhood. The site of the fracture and its variety may often be predicted by a knowledge of the history and mechanism of the fall.

(3) Injuries to epiphyses, whether strain, sprain, or disjunction, should be recognized and treated as fractures because of their importance in the growth of the bones and because epiphyseal injuries often predetermine infections, typically tuberculous.

(4) Diagnosis may be established clinically by the mechanism and "wincing" tenderness. If deformity exist it is unjustifiable to elicit further signs of fracture. Skiagrams are of corroborative value, but by no means the final arbiters. Their chief value is in showing the degree of deformity and its presence after reduction.

(5) Owing to the delicacy of the radius and ulna in childhood fracture is the rule, while contusion and sprain are the exceptions.

(6) Treatment is begun by the administration of an anæsthetic if deformity exist. Otherwise a carefully prepared and padded splint (or splints) is applied firmly and without undue pressure. Skiagraphic control of reduction is important. Massage and passive motion are adapted to the individual case. The splints must be removed as soon as there is firm union.

(7) Operation is indicated only when conservative treatment is admittedly a failure. It will seldom be necessary. The inlay method of Albee should be used instead of an array of metal fixtures.

TABLE V*

TABLE OF ONE HUNDRED CASES OF FRACTURES OF THE BONES OF THE FOREARM IN CHILDHOOD

Group 1. Fracture of Radius and Ulna in Upper Third: 4 Cases

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Greenstick Radius	Greenstick Ulna	Complete Radius	Complete Ulna	Displacement	Remarks
1	36184	..	+	2	From steps	..	+	+	+	..	..	Angulation	Dressed in full supination.
2	39755	+	..	13	Upon forearm	..	+	..	..	+	+	Of radius	
3	41263	+	..	10	Upon extended hand	+	..	+	+	..	..	o	Internal angular splint.
4	35301	+	..	12	From bicycle	..	+	+	+	..	..	Angulation of ulna.	
	4	3	1			1	3	3	3	1	1	3	

Group 2. Fracture of Radius and Ulna in Middle Third: 14 Cases

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Greenstick Radius	Greenstick Ulna	Complete Radius	Complete Ulna	Displacement	Remarks
5	39275	+	..	9	Jump from tree-stump	+	..	+	+	..	..	o	Dressed in full supination.
6	35114	+	..	17	While running	+	..	..	..	+	+	Of radius	Dressed in full supination.
7	36264	+	..	11	Downstairs	..	+	..	+	+	..	+ +	
8	36892	+	..	9	From skates	..	+	..	..	+	+	Slight volar angulation.	
9	36078	..	+	9	Upon forearm	..	+	+	+	..	..	Angulation of ulna.	
10	36266	+	..	3	From chair	..	+	+	+	..	..	Slight dorsal angulation	"Buckling," forearm probably doubled under.
11	38342	+	..	9	Slipped, losing balance	..	+	..	..	+	+	o	Fractured twice before.
12	37475	..	+	7	Upon forearm	+	..	+	+	..	..	o	
13	35446	+	..	14	From horse	..	+	..	..	+	+	Slight dorsal angulation	Five weeks old callus present.
14	34613	+	..	15	From bicycle into ditch	+	..	..	..	+	+	Slight ulnar angulation	Treated by gypsum case in Texas.

15	38253	+	..	14	From skates	+	..	..	..	+	+	Slight volar angulation.	
16	38655	+	..	13	From skates	..	+	..	..	+	+	Slight volar angulation	Dressed in full supination.
17	37746	..	+	11	?	+	..	+	..	..	+	Ulna encroached on interosseous space.	
18	35405	+	..	3	?	..	+	..	+	+	..	Slight lateral angulation	Ulna incomplete internally.
	14	11	3			6	8	5	6	9	8	11	

Group 3. Fracture of Radius and Ulna in Lower Third: 32 Cases

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Greenstick Radius	Greenstick Ulna	Complete Radius	Complete Ulna	Displacement	Remarks
19	38092	+	..	15	From bicycle	+	..	..	+	+	..	Lateral	"Special."
20	38002	+	..	9	From railing	..	+	+	+	..	..	o	
21	40734	+	..	14	From bicycle	+	..	..	+	+	+	Dorsal and lateral	"Special."
22	40288	+	..	9	While running	+	..	..	..	+	+	Slight volar angulation.	
23	38669	+	..	6	?	+	..	..	+	+	..	Dorsal and lateral	"Special."
24	40201	+	..	14	From skates	+	..	..	+	+	..	Dorsal and lateral	"Special."
25	40312	+	..	11	Upon hyperextended hand	+	..	+	+	..	..	Volar angulation.	
26	41221	+	..	13	Down 3 steps	+	..	+	+	+	..	Dorsal and lateral	"Special."
27	38742	+	..	6	While running	+	..	..	+	..	+	Volar angulation.	
28	33837	+	..	13	On hyperflexed hand	+	..	..	..	+	+	Volar angulation.	
29	35873	+	..	11	From tree, four feet	..	+	+	+	..	..	Volar angulation.	
30	37376	+	..	16	Landing from pole-vault	..	+	..	..	+	+	Volar angulation.	
31	37991	+	..	9	From haystack	..	+	..	..	+	+	Lateral and dorsal.	
32	36883	+	..	12	Struck dorsum of wrist on ground?	+	..	+	..	..	..	o	"Buckling" of radius.
33	41564	+	..	7	From swing	+	..	..	+	+	..	Dorsal	"Special."
34	41033	..	+	4	From porch-rail	+	..	..	+	+	..	o	"Special."
35	39890	..	+	13	While sledding	..	+	+	+	..	..	Volar angulation.	
36	41004	+	..	12	Fighting	..	+	..	+	+	..	Dorsal	"Special."
37	35166	+	..	16	Against curb	+	..	..	..	+	+	o	
38	41262	+	..	10	Upon hyperflexed hand	..	+	..	..	+	+	Dorsal	"Special."
39	35224	+	..	12	From ladder, 10 feet	+	..	..	+	+	..	o	"Buckling" from hyperflexion.
40	41488	+	..	14	Backward on hyperextended hand	+	..	+	+	..	..	Dorsal and lateral	"Special."
41	34125	+	..	14	From skates	..	+	..	+	+	+	Dorsal of ulna	"Buckling" of radius.
42	37129	..	+	8	Upon hyperextended hand	+	..	+	..	..	..	Dorsal.	
43	35066	+	..	11	From tree	+	..	+	+	..	..	Volar of radius.	
												Dorsal	Impaction of radius.

* The incomplete histories in these groups represent those cases not observed by the writer.

TABLE V.—*Continued*

Group 3.—*Continued*

Case	No. of Case Record	Sex		Age	Nature of Fall	Right	Left	Greenstick		Complete		Displacement	Remarks
		M	F					Radius	Ulna	Radius	Ulna		
44	34925	+	..	8	Upon hyperextended hand.....	..	+	+	+	..	..	Dorsal of radius.....	"Special."
45	35168	..	+	17	Downstairs.....	..	+	..	..	+	+	Dorsal.	
46	35101	+	..	12	From high jump, 3 feet.....	..	+	..	..	+	+	Dorsal.	
47	38266	+	..	7	While running.....	..	+	..	+	+	..	Dorsal of radius.....	"Special."
48	36681	..	+	12	From skates.....	..	+	..	..	+	+	Dorsal.....	"Special."
49	37668	+	..	11	From cherry tree.....	..	+	..	..	+	+	Dorsal and mesial.	
50	37822	+	..	9	From tree, 7 feet.....	..	+	+	+	..	..	Dorsal of radius.	
	32	27	5			18	14	10	22	22	10	27	

Group 4. Fracture of Radius (Lower Third) and Ulna (Styloid Process): 6 Cases. Velpeau Fracture

Case	No. of Case Record	Sex		Age	Nature of Fall	Right	Left	Greenstick	Complete	Displacement	Remarks
		M	F								
51	34297	+	..	12	From skates.....	..	+	..	+	0	Abrasion of hand.
52	PH 1756	..	+	10	From swing.....	+	..	+	..	Dorsal.	
53	34768	+	..	14	From porch.....	..	+	..	+	"Silver-fork."	
54	41416	..	+	12	Downstairs upon hyperflexed hand	..	+	+	..	"Buckling" dorsally	Note buckling from hyperflexion.
55	37285	+	..	11	?	..	+	..	+	Dorsal.	
56	38555	..	+	9	?	+	..	+	..	"Buckling" dorsally	Cause probably hyperflexion.
	6	3	3			2	4	3	3	5	

Group 5. Fracture of Radius in Upper Third: 3 Cases

Case	No. of Case Record	Sex		Age	Nature of Fall	Site	Right	Left	Impacted	Complete	Remarks
		M	F								
57	41242	..	+	6	Down 5 steps.....	Neck of Radius....	..	+	+	..	Occasional epiphysis for upper third olecranon present.
58	39320	+	..	14	Upon forearm.....	Neck of radius.....	+	..	+	..	Head of radius slightly luxated anteriorly.
59	40520	..	+	11	?	Shaft.....	+	..	..	..	History incomplete.
	3	1	2				2	1	2		

Group 6. Fracture of Radius in Middle Third: 3 Cases

Case	No. of Case Record	Sex		Age	Nature of Fall	Direct Violence		Greenstick	Complete	Remarks
		M	F			Right	Left			
60	38682	+	..	15	From motor.....	+	+	..	+	Oblique, with loose fragment on side of concavity.
61	35802	+	..	4	From cycle.....	+	+	+	..	Incomplete mesially.
62	41164	+	..	12	Boy trod on.....	+	+	+		
	3	3				3	3	2	1	

TABLE V.—*Continued*

Group 7. Fracture of Radius in Lower Third: 16 Cases

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Greenstick	Complete	Colles's Fracture	Displacement	Remarks
63	35872	+	..	6	Upon hyperextended hand	..	+	..	+	..	0	
64	35015	+	..	5	From cherry tree	..	+	+	..	..	0	
65	34612	..	+	10	?	..	+	+	..	..	Dorsal angulation.	
66	35075	+	..	13	From slipping; upon hyperextended hand	..	+	+	..	..	Volar angulation.	
67	PH 1640	+	..	14	From cherry tree	+	..	..	+	..	Dorsal.	
68	PH 1589	+	..	10	From bed	..	+	+	..	..	0	"Buckling."
69	37959	+	..	11	From fence, striking dorsum on stone	+	..	..	+	..	Dorsal	Impacted.
70	37030	+	..	13	From skates	+	..	+	..	..	Dorsal angulation.	
71	38557	+	..	12	A boy forcibly hyperextended hand	..	+	+	..	..	Dorsal angulation.	"Buckling."
72	41117	+	..	9	Upon hyperflexed hand	..	+	+	..	..	0	"Buckling" from hyperflexion.
73	37948	+	..	17	Upon hyperflexed hand	+	..	..	+	..	Reverse volar	Reverse of Colles's from hyperflexion.
74	36864	+	..	14	?	..	+	+	..	+	Dorsal angulation.	
75	35967	+	..	11	From skates upon hyperextended hand	..	+	+	..	+	Dorsal angulation.	
76	34413	+	..	17	From skates	+	..	..	+	+	Dorsal.	
77	38642	+	..	15	Upon hyperextended hand	..	+	+	..	..	0	"Buckling."
78	41457	..	+	6	From chair	..	+	+	..	+	Dorsal angulation.	
	16	14	2			5	11	11	5	4	11	

Group 8. Strain, Sprain, and Disjunction of Epiphysis at Lower End of Radius

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Juxta-epiphyseal Strain	Juxta-epiphyseal Sprain	Dorsal Displacement	Separation Tip of Ulnar Styloid	Remarks
79	41246	..	+	13	From skates on hyperextended hand	..	+	..	..	+		
80	37996	+	..	9	?	+	..	..	..	+		
81	38115	+	..	14	Upon hyperextended hand	+	..	..	..	+	..	One month old; treated elsewhere for contusion.
82	38604	+	..	14	?	?	?	..	..	+	..	History incomplete.
83	40542	+	..	16	While running, upon hyperextended hand	..	+	..	..	+	..	Annular tenderness.
84	41146	+	..	11	Upon hyperextended hand	+	..	..	..	+	..	One year old; treated elsewhere for sprain; function impaired.
85	40724	+	..	12	?	+	..	..	..	?	..	History incomplete.
86	40171	+	..	10	?	?	?	..	..	?	..	History incomplete.
87	39687	+	..	14	From skates	..	+	..	..	?	..	History incomplete.
88	35194	+	..	13	From pole, 15 feet	+	..	..	..	?	..	Also, chip separated from radial border of metaphysis.
89	36125	+	..	10	From trapeze	..	+	..	..	?	..	Treated elsewhere as sprain. Annular tenderness.
90	35983	+	..	13	Down steps upon hyperflexed hand	+	..	..	..	+	+	
91	41521	+	..	12	From cherry tree upon hyperextended hand	..	+	..	..	?	+	
92	41103	+	..	19	Upon hyperextended hand	+	..	..	+	?	..	Annular tenderness.
93	40657	+	..	13	Upon hyperextended hand	+	..	..	..	0	+	Also, chip separated from radial border of metaphysis.
94	41122	+	..	9	From cherry tree, 15 feet	..	+	+	..	0		
	16	15	1			8	6	1	1	7	3	

TABLE V.—*Continued*

Group 9. Fracture of Ulna in Upper Third: 2 Cases

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Site	Greenstick	Complete	Remarks
95	34140	+	:	11	Upon hyperextended hand.....	+	:	Just below greater sigmoid cavity ..	+	:	Line runs from above and behind downward and forward.
96	40876	+	:	12	Playmate fell on forearm.....	+	:	Shaft.....	:	+	
	2	2	0			2	0		1	1	

Group 10. Fracture of Ulna in Middle Third: 4 Cases

Case	No. of Case Record	Sex M	Sex F	Age	Nature of Fall	Right	Left	Displacement	Greenstick	Complete	Remarks
97	35000	:	+	4	From couch.....	:	+	o	+	:	16 days old; brought because of persistence of pain.
98	35153	:	+	7	From swing.....	:	++	++	: :	++	Diagnosed contusion elsewhere.
99	34654	+	:	14	Struck against log.....	:	:	+	:	+	Direct violence preponderates in fractures of ulna. No luxation of head of radius in this series.
100	37920	+	:	9	From tree.....	+	:				
	4	2	2			1	3	3	1	3	

STATED MEETING, NOVEMBER 2, 1914.

The President, Dr. John H. Gibbon, in the Chair.

SARCOMA OF THE TONSIL TREATED WITH RADIUM

Dr. Nathaniel Ginsburg presented a man, forty-nine years of age, who was brought before the Academy of Surgery a month ago with a tumor of the right side of the pharynx. The condition had been diagnosed as an inoperable malignant tumor of the right tonsil. The case was apparently hopeless from the stand-point of further surgery and the patient was sent to Dr. Newcomet for the use of radium. The entire right side of the throat was filled by a mass which has now entirely disappeared.

Dr. John B. Roberts said that he wished Dr. Ginsburg could tell what the clinical characteristics of really malignant tumors of the tonsil are. There is difficulty in recognizing them with certainty. Three or four years ago a man in his ward at the Methodist Hospital said to him, "You don't recognize me, do you, Doctor? I am the man from whose throat you took the cancer of the tonsil." He then recollected that about ten years before he had operated upon him for malignant disease of the left tonsil. He supposed he was dead long ago. He had sawed his jaw apart, after chloroforming him by means of a tube passed through a tracheal incision, and took out the tonsillar growth and also a portion of the soft palate. No radium was applied and no X-ray. It was before we were familiar with radium and probably before the X-ray was used to any extent. Yet here was a man who lived something like ten years with no return of what was pronounced, by the pathologist making the microscopical examination, a malignant tumor. The man was sent to Dr. Walter Roberts, who could find nothing wrong, except a cicatricial condition where about ten years before there had been this mass. There is something peculiar about these tonsillar growths which is not understood and which the pathologists do not recognize as to the histological structure. Some years previously Dr. Roberts saw a tonsillar growth, which had been diagnosticated by a renowned laryngologist as a malignant tumor. The family physician and the speaker believed it to be syphilitic. This, active treatment proved to be the true diagnosis.