a favorable nidus for the entrance of these germs and the consequent formation of this membrane. This child now continues healthy and grows rapidly.

The third child, 9 weeks old, had been nursed by its mother, a delicate neurotic, suffering from middle ear disease. She had rose asthma disturbance every year so that she was compelled to leave her home in May and spend her summers in Lake Superior ports. She nursed her baby for a few weeks and it grew to ten pounds in weight. Sickness compelled her to wean it at five weeks old. Improper adjustment of food to the child's digestive power soon set up a disturbance, causing vomiting and colic with great fermentive accumulations of gas in the stomach and bowels. Changes in the food failed to reach the correct digestive results and the little one continued in distress, losing sleep and weight, till at 9 weeks old, when the writer first saw the infant, it weighed only eight pounds. Examination showed it much emaciated with a distended abdomen and the skin hanging loosely on its body and limbs. Vomiting followed every meal and constipation was the rule, with great pain before stools. The stools were yellow, dry, and covered with thick mucus. The pain at stool and the mucus over the discharges showed a sore spot low in the colon as in the second child. This infant had been fed too much at each meal and also had too much proteid in its food, thus causing indigestion, constipation and irritation of the colon. The nurse said it had passed some patches of membrane before my attendance, but I failed to find any. A careful adjustment of the food failed to make it grow and a wet nurse was necessary to save its life. With the latter it succeeded satisfactorily. The history of this case was so similar to that of No. 2, that the writer regrets his inability to secure a portion of the membrane for pathologic investigation.

While these cases do not conform to the usual symptoms seen in cases of membranous colitis, the writer feels that they belong to it, even though the pathologic evidences differ from each other. The very early age at which this irritation began and the varying character of the stools, make these cases interesting and is the writer's reason for presenting this subject. While only the first case showed the usual symptoms of loose bowels, recognized as accompanying "membranous colitis," the presence of membrane and mucus with pain at the stool even when with a constipated condition, establishes the fact that the irritation and distress are in the colon, and are of a membranous character. While the etiology is similar in these three cases, they show that the bacteriologic factors may differ greatly.

While the cultures from these two samples of membrane do not agree in character, one showing a colon bacillus and the other showing a mixed infection, the proteus vulgaris with the streptococcus, the irritation, pain and distress were similar, and the infants showed the same emaciation, fermentive disturbance and pain prior to stool.

The importance of recognizing the food as the cause of the sickness in both nursed and hand-fed infants, can not be overestimated. The difference in the character of the food will no doubt account for the different germs in these two cases, the nursed infant showing only a colon bacillus, while the hand-fed one showed two foreign ones.

Writers on this disease describe the loose slimy or mucous character of the stools and their great frequency; but here were two cases, Nos. 2 and 3, which

showed a constipated stool of yellow color and yet membrane was present in both.

These cases illustrate the absolute necessity there is always for the physician to examine the stools himself in gastro-enteric disturbances. Few parents or nurses are skilful and watchful enough to read carefully the digestive process as it is illustrated in this stool product. Only the experienced eye, nose and finger of the physician is capable of doing this work correctly. Only by the knowledge obtained in this way can a correct conception of the digestive errors be obtained, and consequently the right changes be made to meet this difficulty in each and every case of gastro-intestinal disturbance. Without such personal examination by the physician, his ideas of the situation are necessarily second-hand ones and the treatment liable to be wrong.

These cases also show that different bacilli have the power, by their irritative qualities, to form a false membrane on the mucous membrane of the bowels.

URETERAL CALCULUS ACCURATELY LOCATED BY THE X-RAYS AND REMOVED BY AN EXTRAPERITONEAL OPERATION.*

W. W. KEEN, M.D., LL.D., F.R.C.S. (Hon.)

Professor of the Principles of Surgery and of Clinical Surgery,
Jefferson Medical College.

PHILADELPHIA.

Henry E. S., aged 10, of New Bloomfield, Pa., was admitted to the Jefferson Medical College Hospital Oct. 25, 1900, at the request of Dr. E. E. Moore.

Neither his family nor personal history, other than as related below, have any bearing on the case. When he was 2 years old he had an attack of pain in which he passed bloody urine. Five years ago—at the age of 5—he had another attack of severe pain in the region of the left kidney. The pain extended downward into the scrotum and to the head of the penis. It was finally relieved by the application of heat and the use of morphin. Similar attacks have recurred at varying intervals, sometimes every three or four days, sometimes not for two months. During the winter of 1897-98, in several attacks he passed bloody urine and uric acid crystals. What he thinks was a small stone escaped in September, 1900, but neither he nor any one else examined it carefully. In February, 1900, he had scarlet fever and since then his attacks have been much more frequent and severe. He has never had any pain on the right side.

On admission the entire left side of the abdomen was so painful that it was impossible to make any diagnosis as to the location of a stone, though the diagnosis of calculus was perfectly clear and had already been made by his physician. The urine which he passed on admission was clear, amber-colored, sp. gr. 1013, reaction acid, no albumin, sugar, blood, pus or casts present, urea 1.1 per cent.

Dr. Charles L. Leonard took a skiagraph (see Fig.) which showed a ureteral calculus about one-half the size of the last joint of the little finger, in the left ureter, which was thought to be at the pelvic brim, but at the operation was found a little below this level somewhat nearer the bladder.

At the operation, Oct. 31, 1900, I made an oblique incision from above the crest of the ilium and parallel

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Diseases of Children, and approved for publication by the Executive Committee of the Section: H. E. Tuley, Edwin Rosenthal and Samuel W. Kelley.

to it, extending to a point above the middle of Poupart's ligament, and pushed back the peritoneum. I had considerable difficulty in finding the ureter. It was raised with the peritoneum, but was so small, flattened and indistinct that it was some time before I could recognize it. Tracing it downward, just below the pelvic brim, I found a hard mass in which the ureter was apparently lost. No stone could be felt at first, but on cautiously cutting and tearing through the mass, I discovered a ureteral calculus measuring 1.5 cm. in length, 1 cm. in breadth and 8 mm. in thickness. The exterior was rough from the points of many spicules due to crystals, which by their fusion constituted the solid mass. The sharp spicula were especially marked at the two ends. Professor Coplin examined it and reported that the stone was quite dense; the nucleus was dark in color and gave the reaction for mucin. The shell was of calcium phosphate with a trace of organic matter.

Evidently the calculus had ulcerated its way through

the posterior wall of the ureter, had matted together the rectum and ureter and lay in a pouch which was partly intra-ureteral and partly extra-ureteral. The caliber of the ureter was not entirely blocked up by the calculus. The moment that I opened the ureter a very considerable amount of urine, which I estimated at about one-quarter of an ounce, escaped through the ureter from the somewhat hydronephrotic kidney. Though the kidney was somewhat distended, I judged that on removal of the obstruction it would recover itself, especially in view of the recuperative powers of childhood. The edges of the opening in the ureter were then closed by a continuous catgut suture. In view, however, of the inflammatory conditions present, as there would almost certainly be some leakage of urine, I packed a small amount of iodoform gauze against the sutured opening and led the end out through the wound. The muscular wall of the abdomen was then closed with a continuous silk suture, and the skin with interrupted silkworm gut sutures. The gauze packing was removed on the second day after the operation, as I found no

leakage took place. He made a perfectly smooth recovery, the highest temperature having only once been 100 degrees. He was kept in bed for between three and four weeks, so as to allow firm union to occur, with a view to preventing a hernia.

March 22, 1901, a letter from Dr. Moore stated that when he reached home, November 28, he was suffering considerably from pain in the region of the left kidney. Examination of the urine showed the phosphates to be greatly in excess. A purge of calomel relieved him from pain and he has never had any since. There is also no sign of hernia at the site of the wound.

No remarks are needed save to call attention to the accuracy and value of the x-ray picture, both as an absolute verification of the diagnosis and as a guide at the time of operation. Instead of having to open the kidney with the idea that the stone might be there, or to examine the entire length of the ureter to find it, the skiagraph guided me at once to the exact location of the stone.

DISCUSSION.

DR. EDWIN ROSENTHAL, Philadelphia—I have at home a small calculus that was passed by a Russian boy per urethram. The stone had caused considerable pain and hemorrhage. Microscopic examination showed no diseased condition of the urethra, bladder, ureter or kidneys. The case was seen before the discovery of the x-rays and treatment was purely expectant.

I have in mind two cases ending fatally, which I watched carefully almost from their inception. The first diagnosis was calculus. This was followed by hydronephrosis, and still later by pyonephrosis. There was a large tumor on the affected side, which was aspirated once or twice before death. The postmortem revealed the presence of the calculus. If we had only known it I am certain that the life of both these persons could have been saved. Dr. Willy Meyer had examined these cases, and had stated that the pus was from the right side.

DR. C. L. LEONARD, Philadelphia—I have examined and found 47 cases of calculus in the kidney and ureter. In over 50 per cent. of the cases the stone was in the ureter. Of this number, in 4 cases, the expectant line of treatment has been followed, and the patients have passed the calculi. The exact localization of the calculi makes it rational in the case of minute calculi, to adopt this line of treatment. If the symptoms become more severe, the skiagraph enables us to locate and remove the calculus. Where the latter is lodged in the lower part of the ureter, and there has been much inflammation, it is very difficult in the male to reach the stone. In the female it is somewhat more easy. I have had four other cases in which small calculi have been passed while the patient has been waiting for operation. In cases like the case reported, the size of the stone makes it evident that operation is the only course of treatment. The skiagraph, however, localizes the area of operative intervention, simplifies it, and makes it complete.

DR. S. W. KELLEY, Cleveland—I feel gratified that Dr. Keen has reported this case. In my address on the first day, I emphasized the importance of surgery in children, and commented upon the general neglect of this department of pediatrics. A report of this kind is most appropriate for presentation to this Section, and we hope to have more of them.

DR. CLIFTON SCOTT, Des Moines—I am very sure that the value of the x-ray method here is of negative as well as of positive value. I had under observation an adult whose illness I diagnosed at first as nephritic colic. If an x-ray examination had failed to show the presence of a renal or a ureteral calculus, my error would have been shown. As the hemorrhage continued, and small clots were discharged, the case passed into other hands. An operation was undertaken in the region of the kidney. A tumor of endothelial origin was revealed which had invaded the pelvis of the kidney, and had given rise to the hemorrhage. There was no calculus present.

Dr. W. W. KEEN, in reply—I have on at least four occasions cut down upon the kidney in adults under the impression that I had to deal with a stone, and in each instance no stone was found. I think that with the use of the *x*-rays the negative value is quite as great as its positive value by enabling us to avoid such mistakes in operation.

REMARKS ON SPINAL SURGERY, WITH ILLUSTRATIVE CASES.*

ANDREW J. MCCOSH, M.D.

NEW YORK CITY.

The spinal canal has for many centuries been considered legitimate ground for operative procedures. As early as the 7th century the advisability of operation for fractured spine was urged by Paul d'Egine¹ and others. In the 16th century and since that time, various surgeons have advised operative interference for the relief of this condition, but it was probably not until the beginning of the 19th century that a definite operation was performed for a fractured spine. Since then the subject has constantly thrust itself into prominence and has been much debated and often with considerable heat and vigor. This was especially true of a discussion which took place in the Royal Society of Surgery of London in 1820.

About the same time (1823), A. Cooper wrote: "If you could save one life in ten, aye, one in a hundred, by such an operation, it is your duty to attempt it, notwithstanding any objections which some foolish persons may have urged against it. Though I may not live long enough to see the operation frequently performed, I have no doubt that it will be occasionally performed with success. There is no reason why it should not, and he who says it should not be attempted, is a blockhead." This opinion of the great English surgeon will be accepted by most of us, and it is not very flattering for our self-conceit to feel that at the present day we can not honestly offer a much more favorable prognosis than was given in this statement written nearly a century ago.

Even at the present day there is some difference of opinion on this subject. I remember only last year in an editorial in one of our own leading journals operation on this class of cases was almost condemned or at least no encouragement was given for operative interference. It is true that the majority of cases of severe injury to the spinal column must perish but undoubtedly many a life has been saved by timely interference. I say "timely," for unfortunately delay of a few days before the operation has been performed has in more than one case been responsible for its failure. The tendency in the past has been much more toward the "waiting and watching policy" than has been the case when the brain is compressed by bony fragments. There are quite as urgent reasons for rapid relief in cases of pressure on the cord as there are in cases of depressed fractures of the skull, though perhaps it must be said the results of operation for the relief of fractured vertebræ are less satisfactory than are those for fractured skull, at least such has been the case in the past. The reverse may be said to be true in regard to tumors. Early operation in cases of injury of the vertebræ is of the utmost importance. Of course at times there may be good reasons for delay. The patient may be in a condition

of great shock due very possibly to severe injuries of other organs. In such an event it is wiser to wait until it at least can be determined that the case is not one which under any circumstances must end fatally. If it be such, no benefit can be derived from operation. Again, it is sometimes difficult to determine that the symptoms are not due to mere contusion of the cord, or to more pronounced hemorrhage within the substance of the cord—hematomyelia. A certain time must often elapse before this point can be determined.

In this class of cases where surgical interference is not indicated, the symptoms are apt to be of an irregular type. The muscular paralyses are not complete and often the muscles of the same group may not be equally affected; the anesthesia is only partial and paresthesia with patches of hyperesthesia is common. The symptoms of irritation are apt to be less pronounced, though there may be mild twitching at first of certain muscles. The reflexes are not apt to be abolished, though they may be altered. The following cases are in many respects typical:

CASE 1.—Concussion upper Dorsal Cord; Slight Disturbances, sensation and motion; Recovery: D. O. C., male, aged 20. On April 5, 1891, when intoxicated, fell two stories, lighting on his back. He was helpless when found. He complained of pain in the back of the neck. There was no deformity. On April 6, there was evidence of some weakness of the left arm, especially in the flexor muscles. Both patellar reflexes were very feeble. Several areas of paresthesia were present in the lower extremities and trunk. On April 7 and 8, the weakness of the right arm manifested itself. There was more or less persistent priapism. On April 12, the symptoms began to improve and continued so until he was discharged on May 25, when with the exception of slight weakness of the left arm he was practically well.

CASE 2.—Injury of Lumbar Cord; Probably due to hemorrhage; Disturbances of Motion and Sensation; Pain; Ultimate Recovery without Operation: J. O. B., male, aged 34, on July 23, 1889, fell down the shaft of an elevator a distance of 30 feet. He lighted on his feet but fell down and was unable to rise. He had lost almost all power over his lower extremities. He was taken to a hospital in an ambulance. He suffered from considerable neuralgic pains in his legs and feet, and his legs and thighs felt numb and were partially paralyzed.

He was brought to the Presbyterian Hospital on July 27 with a diagnosis of fracture of the second and third lumbar vertebræ. On examination it was found that the peroneal and anterior tibial groups of muscles were partially paralyzed, especially on the left side. There was an anesthetic band extending from the outer side of the foot upwards along the outer and posterior side of legs as far as the middle of the thighs. A few days later it was found that a. c. c. was greater than c. c. c.

It was considered wise to defer the operation as there seemed to be some improvement in the paralyzed muscles. The pain was disappearing, there were no spasmodic movements of the muscles and no contracture developed. Through August and September gradual though slow improvement both as regards motion and sensation took place. He was discharged from the hospital on October 1, at which time he could walk about the ward though he still suffered from foot-drop. After his discharge he continued slowly to improve and at the end of a year he was practically well.

CASE 3.—Concussion of Lower Dorsal Cord; Slight Disturbances of Sensation and Motion; Recovery without Operation: J. D., male, aged 25, on June 1, 1901, while in the act of boarding a car, was struck on the back by a car coming in the opposite direction. He was knocked down and when found by the ambulance surgeon was in a state of considerable shock. He was slightly alcoholic, and complained of extreme pain in the lower dorsal region.

* Read at the Fifty-second Annual Meeting of the American Medical Association, in the Section on Surgery and Anatomy, and approved for publication by the Executive Committee of the Section: W. J. Mayo, H. O. Walker, and A. J. Ochsner.

1. Trans. by René Briau, p. 409.