considered lumbago and sciatica are really instances of sacro-iliac displacement.

ACUTE POTT'S DISEASE.

DR. YOUNG presented a girl, aged 13 years, who was seen by him July 10, 1909, at the Polyclinic Hospital. She was then suffering from an acute inflammation of the cervical vertebræ. The history was that on April 7, 1909, she laid all night on a lounge with her head hanging over the end. In the morning it was found that the head was drawn to one side and she experienced great pain which increased greatly and was not improved by medical treatment, especially massage and electricity, and she was referred to Dr. Young by Dr. Victor Loeb. For the correction of the torticollis she was placed in bed for ten days with head extension. The pain at this time and preceding the first examination was of a most acute character and the patient was prostrated. The X-ray revealed an inflammatory lesion of the third cervical vertebra. A special extension head brace designed by the reporter was applied, and subsequently she was sent to the seashore. The deformity has disappeared and her recovery is now complete.

PERINEPHRIC ABSCESS.

DR. MORRIS BOOTH MILLER read a paper with this title, for which see page 382.

DR. JOHN B. DEAVER said that in the etiology of perinephric abscesses traumatism without question plays a part. There are, of course, a certain percentage of these cases which are hæmatogenous and a certain number which are tubercular. In one of his cases, in which Dr. Miller had witnessed the operation, he could not differentiate the condition between a high appendiceal and a kidney condition. There were no symptoms referable to the kidney either in the shape of subjective symptoms, or from X-ray, or cystoscopic examination, ureteral catheterization, or chemical examination of the urine. She had circumscribed tenderness anteriorly but not posteriorly. He opened her abdomen believing it to be a tubercular case with abscess, and that if he did not succeed in reaching the abscess cavity that he could at least locate it. When the incision was made serous exudate immediately escaped; there were enlarged mesenteric glands and exudate around the duodenum and hepatic flexure of the colon;

the post-peritoneum was densely infiltrated and adherent at the latter point,—all these conditions pointing to the kidney. The incision was closed and a posterior one made; the perinephric fat and capsule were normal, but an abscess upon the anterior surface of the kidney beneath the true capsule was found. He firmly believed the case to have been tubercular, although no tubercular reaction was obtained on administration of tuberculin, and the patient made an uninterrupted recovery. In a more recent case of localized abscess of the upper pole of the left kidney in which the colon bacillus was found, he questioned if it was not also tubercular and the presence of the colon bacillus due to a mixed infection. More frequent than perinephric collections are collections within the kidney. His experience with this condition tallies with Dr. Miller's conclusions, that in perinephric conditions where the kidney is healthy practically all get well.

Dr. John B. Roberts said that Dr. Miller's paper gave some light as to diagnosis by speaking of the kidney triangle where pressure located at this point, earlier than other symptoms, may lead to a diagnosis of perinephric lesion. If he is correct in thinking that pus around the kidney gives a higher leucocyte count than similar abdominal lesions, this should be a very valuable aid in diagnosis. He is right in saying that a good many cases of perinephric abscess are primary and not secondary to the kidney lesion. He recalled two cases seen some years ago, one a case of perinephric abscess the result of an internal urethrotomy for an old stricture, and in the other case a perinephric abscess the result of a gonorrhœa causing general sepsis, there being abscesses in other parts of the body also.

Dr. John H. Gibbon said, in reference to perinephric abscess not having its origin in the kidney, he thought many conditions were called perinephric abscesses which were not. Many are tuberculous, having their origin in the muscle sheaths. Surgeons are apt to call an abscess opened posteriorly a perinephric abscess. Those which are truly tuberculous, he thought, keep up discharging for months and months, many afterwards developing some change in the lumbar spine, showing an origin in Pott's disease. Tuberculous muscular abscesses are often called perinephric; they are not perinephric, they are in the abdominal wall and the surgeon has not gone through the muscular wall before he has opened the abscess. This explains the absence of any

symptoms relative to the kidney in many so-called perinephric abscesses.

DR. MORRIS BOOTH MILLER (in closing), in answer to the suggestion that some of the cases reported were tuberculous, said that he had attempted to exclude all doubtful cases. The bacteriological examinations show no tubercle bacilli but the ordinary pyogenic micro-organisms were present in all the cases noted save two, where it was stated that the pus was sterile.

Dr. Roberts did not mention that 26 years ago he read before this Academy a masterly paper on the subject of perinephric abscess with particular relation to the referred pain, based upon careful anatomical studies. This work, which was published in the *American Journal of the Medical Sciences*, April, 1883, stands to-day as an authority upon this phase of the subject and as such has been frequently quoted.

The case mentioned by Dr. Deaver was an unusual one. In it the pus was entirely confined beneath the fibrous capsule and none was found in the adipose capsule. It was a staphylococcus albus infection. It was a difficult case to diagnose as the symptoms were vague though pointing to some upper abdominal trouble on the right side. Fever was moderate and the urine was normal. However, the leucocytosis was as high as 30,000 and there was a history of cough early in the attack.

He called attention to the apparent greater frequency of this disease in this country in contrast to European statistics. Socin found 4 cases out of 16,661 and Sutter noted 1 in 4437 cases. At the Presbyterian Hospital he had found 5 cases out of a total of 10,429, and at the German Hospital—where about 3500 cases are treated a year—the average number of perinephric abscesses is 2.

PUS IN THE ABDOMINAL CAVITY.

DR. JOHN B. DEAVER read a paper with this title, for which see the April issue of the ANNALS OF SURGERY.

DR. WALTER G. ELMER inquired as to the value of abdominal irrigation especially in connection with stab wounds or gun-shot wounds of the abdomen in which the intestines have been completely severed. In such cases the surgeon has to deal with a very low grade of infection—the colon bacillus—which in its normal state is not virulent.

In regard to operating for appendiceal abscess and not remov-

ing the appendix he related the case of a trained nurse who undoubtedly had an appendiceal abscess but persistently objected to operation on the plea that her appendix had been removed. When, after much persuasion, the abscess cavity was opened the appendix was found inflamed and gangrenous, although the patient had been under the impression that it had previously been removed. He thought it would therefore always be better to tell patients when after such operations the appendix is left undisturbed, in order to prepare them if necessary for future developments.

DR. JOHN B. DEAVER remarked, relative to the question of subdiaphragmatic abscess, that he had seen a large number of such cases. He had never seen a case of subdiaphragmatic abscess without some effusion in the pleura of corresponding side. The best way is to early resect the ninth rib; do not wait until the case is far advanced.

In the 70 cases of peritonitis he reported a bacteriological examination was made and a pyogenic organism found. Many were sick more than 40 hours. He maintained that if every case of peritonitis in the lower abdomen, particularly of the appendix, the gall-bladder and the pelvis, was operated upon within 40 hours of its onset, the mortality would be very small, probably 1 per cent. When the peritonitis has lasted for 50 hours the mortality begins to crawl up.

He had learned that a circumscribed appendiceal abscess where the appendix is not accessible is better treated without the removal of the appendix. There was a time when he did what Murphy had recommended, open the peritoneum, pack with gauze above the abscess and take out the appendix. He did this before Murphy recommended it and stopped doing it long before. In the majority of cases, say 45 out of 50, one will be able to remove the appendix, but there will be one case every now and then where the appendix had better not be removed.

As to drainage in stab wounds of the peritoneum, he had operated upon very few such cases. He had one case not long since of rupture of the intestines where suture was required. He no longer washed such cases out, but wiped them. He was not as much afraid of fæces in the peritoneal cavity as he was of pus. He was not afraid of the colon bacillus in the peritoneal cavity unless associated with pus.

PLUGGING A VESICOVAGINAL FISTULA.

DR. GEORGE ERETY SHOEMAKER reported the history of a woman in whom a large tumor of the kidney was bleeding so freely as to choke the bladder. It was decided not to attempt removal of the offensive decomposing clots with an evacuator, with the probable necessity of repeating the operation as hemorrhage continued. The hæmoglobin was already 25 per cent. and infection of the kidney imminent. A vaginal opening was therefore made into the bladder and the clots removed, after which

FIG. 1.

Temporary closure of vesicovaginal fistula by distended rubber finger-cot, for cystoscopy.

frequent irrigation easily made the field clean. It was now necessary to prove the sufficiency of the opposite kidney. Any one who has tried to cystoscope the collapsed bladder with a fistula in it will appreciate the problem. The following procedure was adopted with entire success.

With the assistance of Dr. Laws the end of a piece of rubber tubing was lashed tightly into the open end of a thin rubber finger-cot. The collapsed rubber bag thus made was pushed part way through the fistula so that one-half was in the bladder, the other half in the vagina. On distending the rubber bag with water the two ends dilated while an isthmus formed at the site of the fistula, holding the appliance in place. The valve-like action made a tight closure. Water was now injected into the

woman's bladder and the cystoscope used as usual. By watching the spouting of blued urine from the two ureters it was determined that one kidney was doing nearly all the work. Nephrectomy was successfuly done. The fistula was afterward closed under local anæsthesia, using eucaine and adrenalin.

It was found experimentally that it was not difficult to keep this patient dry with this apparatus for some hours by clamping the tube. However, when her bladder contracted after normal urination there was a tendency to drive the fluid out of the inner sac and thus displace the appliance. Of course a longer and larger bag can be used for a larger fistula.

SUBPHRENIC ABSCESS FOLLOWING APPENDICITIS.

Dr. John H. Jopson reported three cases of subphrenic abscess secondary to appendicitis, as follows:

Case I.—M. M., male, aged 40, was operated upon at the Presbyterian Hospital in August, 1906, for an acute gangrenous appendicitis and diffuse peritonitis. Removal of the appendix, drainage, Fowler position, enteroclysis. The abdominal symptoms were promptly relieved. The temperature, however, continued elevated between 100–102°, without marked increase in pulse or respiration, while the general condition was excellent.

Failing to find evidences of accumulation in the lower abdomen, and flatness being present over the lower lobe of the right lung, posteriorly, puncture of the pleura was practised on the seventeenth day, with negative results. Dulness persisted, but characteristic physical signs were absent. Patient's condition continued good and diagnosis by exclusion pointed to subphrenic collection, which diagnosis was confirmed by Dr. W. E. Hughes four weeks after operation. On the following day, before operation could be performed, the abscess discharged through a bronchus, much pus was expectorated, and the patient experienced characteristic shock with high fever, accelerated pulse and anxious expression. Aspiration in the ninth inner space gave pus from beneath the diaphragm, and operation under local anæsthesia, twelve hours later, showed the pleural cavity the sight of much recent effusion, and a subphrenic abscess, which was drained by transpleural route. Recovery followed.

No pleural or pulmonary infection or irritation were present until rupture occurred, and the prolonged elevation of tem-

perature and the modest physical signs at the base of the right lung were the only danger signals present before rupture and pulmonary shock developed.

CASE II.—Catherine T., aged 8, white, was operated upon at the Presbyterian Hospital, September 9, 1909, for acute appendicitis of two days' duration. The appendix lay well above the crest of the ilium, in the posterior position. It was perforated, gangrenous, lay in a moderate sized abscess, and was removed. Counter opening made in the loin, drainage by tube and gauze instituted. Pleural friction rub developed on the right side the following day, and twelve hours later there were fine râles over the same area posteriorly.

For three days the temperature continued elevated, pulse rapid and irregular (140–160), respirations from 40–48, and she was delirious. There were râles and harsh breathing over the right base posteriorly. Her condition then improved somewhat, but the temperature remained at about 100, pulse and respiration still rapid. There was dulness as high as the scapula on the right side, fine râles, and a loose cough. A small fecal fistula was observed in the posterior wound; otherwise the abdominal condition was satisfactory. The diagnosis was bronchopneumonia. On the fourteenth day her condition was noted as not so good. She had lost much flesh, took her nourishment poorly, temperature ranged from 99–101, physical signs in the chest remained the same, diarrhœa was present. Tuberculosis was suggested by a medical colleague. On the eighteenth day the subphrenic space was aspirated, in the ninth inner space posteriorly, and foul, thick pus was evacuated. Operation refused, but consented to on the following day.

Operation was performed on the nineteenth day after primary operation. Posterior transpleural drainage by resection of ninth rib behind postaxillary line. Pleural cavity contained no effusion, but wall was gray and œdematous. Suture of parietal and visceral layers of pleura, and further protection of pleural cavity by packing. Large abscess found beneath the diaphragm extending as far toward the median line as the vertebral column. Operation well borne. Death from exhaustion the following day.

In this case there were symptoms of pleural inflammation, and later of consolidation in the right lung. Moderate, persistent

elevation of temperature, rapid pulse and respiration, and later rapid emaciation.

Counter opening at the first operation was made by reason of the high location of the appendix, with the deliberate intention of avoiding a subphrenic infection. This it failed to do, or, more probably, such infection was already present. The symptoms closely simulated those of septic pneumonia. The prolongation of the process and the rapid emaciation indicated the subphrenic location of the infection. Had aspiration been practised earlier, it is possible that recovery might have resulted. No postmortem was obtained and we cannot say, therefore, whether a pneumonia had been present or whether the symptoms were only those of subphrenic abscess and secondary pleurisy.

CASE III.—Mrs. Ada V., aged 25, was operated upon at the Presbyterian Hospital, June 29, 1909, for acute appendicitis of three days' duration. The appendix was perforated and gangrenous, pointed upward beneath the liver, almost touching it, and extending deeply into the right subcostal region. There was an abscess at this point, a large collection of pus in the pelvis and free pus all through the right side of the abdomen. Tube and gauze drainage from right subhepatic space to pelvis. Murphy-Fowler after treatment. Right-sided pleurisy developed promptly after operation with slight increased dulness over lower chest posteriorly. Temperature remained elevated with brief remissions, ranging from 100–102. There was profuse purulent discharge from the wound; pus was washed out in large quantities, especially from the upper tube. Secondary posterior drainage was considered, but gradual diminution of discharge, occasional remissions of the temperature, and the fact that the general condition remained fairly good decided against it. The temperature fell to normal after three weeks, but rose again, and on July 31 patient expectorated small amounts of pus of decided odor. There was flatness to the ninth rib posteriorly and forward to the postaxillary line. No alteration of area of dulness on change of position, diminished fremitus over the area. Discharge of pus was much diminished. There was evidently a subphrenic collection, and operation was deferred for a day or two on account of moderate shock. There was rapid improvement, however, and the abscess finally drained itself; small amounts of pus being expectorated, the greater portion being washed out through the tubes. Aspiration of the pleura on one occasion gave only serum.

The patient made a tedious recovery, with final complete return to robust health.

A study of this case shows that following appendiceal perforation and abscess in the subhepatic region there were prompt development of pleural inflammation, as shown by the usual symptoms: friction rub, pain, etc., a prolonged period of moderate fever, the development of a subphrenic collection which was evacuated partly through the lung, but mainly through the drainage tract. Aside from some loss of flesh, constitutional depression was mainly conspicuous by its absence, except on two or three occasions when shock and pulmonary irritation were marked, notably when pus was evacuated through the bronchi.

Some criticism might justly be made, because secondary drainage of the subphrenic space was not instituted. Temporary improvement, however, occurring on each occasion when operation had been decided upon, resulted in postponement, and the patient was finally fortunate enough to escape without a transpleural thoracotomy, which while a comparatively simple and easy operation in itself, is attended by certain manifest risks. Nor could this case fairly be classified as recovery of an unoperated case. Drainage vicarious but finally successful through the long tract between the abdominal wound, the posthepatic and subphrenic regions was present from the first, and comparatively a small amount of pus perforated the diaphragm and bronchus and was expectorated.

Dr. Jopson remarked further that subphrenic abscess is a rather infrequent complication of appendicitis. Elsberg collected 73 cases and Eisendrath added 33, a total of 106 cases reported up to 1908. Weber noted it in 9 cases out of 350 cases of appendicitis, and Moschowitz found it 8 times in 2000 cases in the Mt. Sinai Hospital. Appendicitis ranks according to most authors after gastric and duodenal ulcer, as the most frequent cause of subphrenic abscess, one-third of the cases being due to perforated ulcers around the pylorus, and one-sixth to appendicitis. Of the seven cases of subphrenic abscess which he had seen, in three it followed peritonitis from perforation of the appendix. The splendid paper by Barnard in the *British Med. Journal* in 1908, was a noteworthy contribution to the anatomy of these and other types of subphrenic abscess. The majority of subphrenic abscesses from appendicitis are intraperitoneal, the pus finding its way upward behind the cæcum and colon, and the

position of the appendix has much to do with favoring such a course. The posterior position of the appendix, and especially a high location, places the abscess in the most favorable site for invasion around the liver to the subphrenic space. An extraperitoneal collection on the right side may form between the layers of the coronary ligament, which it separates, being continuous with the retroperitoneal tissue below, as Barnard emphasizes; an appendiceal collection which takes an upward course may reach it and become subphrenic without perforating into the peritoneal cavity. In the early stages, in cases of intraperitoneal infection, the process is diffuse, later the collection is walled off, forming a localized abscess. Hence, the advantage of postponing operation by the transpleural method in the early stages. The abscess at this time is small in size, deeply situated under the dome of the diaphragm and consequently difficult of access by this route. In the early stages the lumbar route is to be preferred. Occasionally the abscess will point in the epigastrium, and is conveniently opened there. In the majority of cases of any standing the abscess grows in size, pushes the lung up, the costophrenic sinus of the pleura is obliterated and posterior thoracotomy with drainage through or below the pleura is to be preferred.

Posture is an important factor in the development of subphrenic infections. Lymphatic drainage in the abdomen is upward through the diaphragm. In addition to this the subphrenic space is a natural anatomical pocket when the patient is in a recumbent position; hence, the influence of gravity in spreading infection to this neighborhood, and hence, also the advantage of the Fowler position in overcoming it. Unfortunately, infection has oftentimes reached this point before the case comes to the operating table, especially when the appendix is in the position already described.

As is well known the *symptoms* of such collections may be acute or chronic. In the very acute cases the temperature is often markedly elevated, the pulse may be very rapid, and severe pain, nausea, vomiting, with chills and sweats and the acute constitutional symptoms of sepsis may be conspicuous features. The points he would emphasize, however, are, that a moderate continuous elevation of the temperature, a pulse little if any above the normal, an entire absence of abdominal symptoms, and a physical expression of comparative comfort and well-being are

to be recognized as not inconsistent with the presence of a subphrenic abscess. Owing to adhesions of the liver to the diaphragm the liver is not often displaced downward, at least anteriorly. Most of the physical signs are to be looked for in the chest, except in those cases where the abscess bulges forward in the right hypochondrium, forming a swelling in that region which occurs when the subhepatic space is involved. Otherwise, compression and inflammation of the lung, due to an upward projection of the abscess, are produced.

In regard to the *diagnosis* of subphrenic abscess from pleural effusions and pulmonary consolidations, it has been his experience that reliance on text-book descriptions, and the attempt to elicit the finer shades of distinction as to the exact shape and definition of areas of dulness, may be fallacious and lead to error, even on the part of the most skilful clinicians. It is not to be wondered at, therefore, that one's faith in physical signs is sometimes shaken.

Dulness over the base of the right lung posteriorly is a valuable sign. If it occurs in connection with diminished tactile fremitus, and a continuous elevation of the temperature, without adequate explanations in the abdomen, following an appendiceal operation, one may suspect that a subphrenic collection is present. The most frequent association of physical signs in these cases is said to be dulness with limitation or absence of breath sounds, vocal resonance and tactile vocal fremitus. The area of dulness is convex upward, unless gas be present. In the latter case tympany overlies dulness, and amphoric and coin sounds are presumably present. Immobilization of the thorax on the same side is sometimes noted, with cough and expectoration. Of course, the expectoration of pus is confirmative, but it is much to be desired that the diagnosis be made before this stage is reached; not only because sepsis may be much advanced, but because, as it has been his experience to see several times, the rupture of pus into a bronchus either from empyema or subphrenic abscess is attended by a degree of shock which makes operation at that time highly unfavorable.

Barnard did not find either friction sounds or râles present with any great frequency in his series, but the occurrence in two cases under Jopson's observation, of pleurisy and evidences of pulmonary involvement almost immediately after operation, and both in cases where infection was present in the subhepatic region

from the time of rupture of the appendix, makes him inclined to believe that these symptoms are of some diagnostic value.

In cases of doubtful diagnosis the use of the exploring needle is of paramount importance; and its use at an earlier time than usually practised would undoubtedly result in saving a larger percentage of cases. If pus is found on aspiration of the subphrenic region below the ninth rib, operation must be at once proceeded with, as leakage and infection of the pleura through the needle puncture will almost certainly ensue if the costophrenic sinus has not been obliterated by inflammation. This occurred in Case I. Fortunately such obliteration often takes place early, and the drainage of the abscess can then be accomplished without risk of infection of the general pleural cavity. In a case of subphrenic abscess in a child reported some years ago by Dr. Jopson, the abscess had pointed through the diaphragm, both layers of the pleura and the chest wall, forming a collection outside the lateral wall of the thorax without infection of the general pleural cavity.

With few exceptions posterior thoracotomy is the route to be chosen in draining these abscesses. Many cases can only be reached by a transpleural operation, and if care be used in suturing the visceral pleura and the diaphragm to the intercostal muscles and further protecting the pleura by gauze before going through the diaphragm, serious infection of the pleura will usually be avoided. In this connection the subpleural methods of Elsberg and Eisendrath may be mentioned. The operation itself is a simple and easy one. It is the condition for which operation is done that makes the prognosis so serious and which furnishes the 25 per cent. mortality. High as this mortality is, it is lower than that of subphrenic abscess in general, which is estimated at from 35 to 42 per cent. in operated cases.

It is interesting to note that in children the mortality from subphrenic abscess is less than it is in adults. In 1903 Jopson collected 23 cases in patients under fifteen years of age. The mortality in 15 cases in whom operation was performed was 13.3 per cent. The explanation of this is probably to be found in the fact that appendicitis is the most frequent cause of subphrenic abscess in children, in whom perforation of gastric and duodenal ulcers with their excessive mortality is rare. In seven cases of this series, appendicitis was the cause of the infection. Most of the other causes active in adult life were present occasionally.