forceful mouth to mouth insufflation are also avoided. In fact, the infant is subjected to no physical force the degree of which cannot be accurately measured and controlled.

The present report is the first one that deals with the use of the Drinker respirator in the treatment of asphyxia neonatorum. The number of observations that have been made is very small. Many more similar observations will have to be collected before a great deal is known about the use and limitations of the method. From our present experimental and clinical studies however, it is believed that this apparatus offers the simplest, safest and most scientific method for treating asphyxia of the new-born.

EXTRAPERITONEAL PELVIC CONDITIONS IN WOMEN

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It is not with the intention of presenting any new method of diagnosis or treatment that I have prepared this paper. It is rather to direct attention more forcibly to a group of conditions which, although not of frequent occurrence, are encountered sufficiently often to deserve more attention than is usually given them.

Specifically, by reporting a few cases that I have had under my care I will stress the fact that any one doing abdominal surgery is apt to encounter an inflammatory condition or tumor which, on superficial examination, appears to be within the peritoneal cavity, whereas careful study will show it to be extraperitoneal.

The general treatment and the surgical approach are different in extraperitoneal and intraperitoneal conditions, and failure to differentiate between these two groups of cases may result in serious consequences to the patient. On three occasions I have been asked to see patients who were supposed to have tubo-ovarian or appendical abscesses but who really were suffering from right-sided extraperitoneal broad ligament abscesses caused by a streptococcus. One can easily appreciate what would have happened if I had opened the peritoneal cavity and scattered it in the streptococci that were present in the broad ligament.

Virchow 1 first used the word parametritis to denote phlegmonous inflammations found in the pelvis outside the peritoneal cavity. In an article published in 1862 he gave a comprehensive description of this condition. Parametritis includes exudates in the retro-cervical and pre-cervical tissues, and those behind the symphysis pubis anterior to the bladder. It is, however, the intraligamentous infiltrations in the base of the broad ligaments which are seen most commonly and which, when suppuration occurs, form broad ligament abscesses.

These broad ligament exudates extend from the side of the uterus to the bony pelvic wall, then anteriorly around the ureter, raising up the peritoneum, and often appearing above Poupart's ligament. The streptococcus is the usual organism found and is especially apt to enter the tissues after a pregnancy or abortion.

It is sometimes difficult to differentiate a parametritis from inflammation of the pelvic peritoneum, but by careful study this can usually be done except in cases in which the two conditions coexist. Although in parametritis there is sometimes induration on both sides of the uterus, it is the usual thing for the infection to be limited to one side. When both broad ligaments are involved there is fixation of the uterus, which increases the difficulty in differentiating an extraperitoneal from an intraperitoneal pelvic infection.

Parametritis occurs almost never except in puerperal and postoperative infections, although a few rare cases of gonorrhreal origin have been reported. The history of the case, the failure to find gonococci in the vaginal smears and the lack of involvement of the urethra and of Bartholin's glands are helpful in excluding a gonorrheal infection. If, in an infection presumably non-gonorrhreal, it is possible by manual examination to move the uterus and ovaries freely without causing pain to the patient, and if the induration of the pelvis seems to be separate from the adnexa, one should strongly suspect parametritis.

In parametritis the exudate is characterized by a hard infiltration which does not show signs of softening until late in the disease. In pelvic peritonitis the masses are frequently soft and it is not possible to move the uterus and ovaries without causing great pain. When there is a history of a puerperal infection and on abdominal palpation one can make out a firm tender mass pointing above Poupart's ligament, a diagnosis of parametritis is admissible. A typical example of an extraperitoneal broad ligament abscess is afforded by a case which I saw one year ago:

REPORT OF CASES

Case 1.—Mrs. M. M., aged 35, was referred to me by Dr. Wetherbee Fort because of pain in her right side. Her past history had no bearing on the present illness. She had been married five years and had had one child and no miscarriages. The menstrual periods had begun at 14 and had always been regular and of five days' duration. There had been no dys-

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menorrhrea. Two months before I saw her, she had been delivered by version and extraction of a full-term baby. The labor was long and difficult. A few weeks after the delivery, she had developed pain in the lower right side of the abdomen and was thought to have acute appendicitis. Because of her weakened condition following the birth of her child, she was treated conservatively with rest and an ice-cap to the abdomen. A few days later, she developed chills and some fever. The patient herself then noticed a hard mass in the lower right side of the abdomen. Dr. Fort was called in consultation. He recognized that she had a puerperal infection and not appendicitis and at once had her admitted to the Bon Secours Hospital, where he asked me to see her.

On examination I found the patient to be very ill. The abdominal examination showed that there was a firm mass in the right lower quadrant of the abdomen, extending toward the right flank. There was no tenderness nor induration on the left side of the abdomen. Vaginal examination showed the cervix normal and the fundus well involved. The left ovary was of normal size and was freely movable. There was no tenderness in the left fornix. High up in the right fornix there was marked tenderness and induration. The right ovary could be felt and separated from this indurated area. The uterus could be moved freely without causing the patient pain. The leukocyte count was 17,000, hemoglobin 68 per cent, red blood cells 3,500,000, temperature 101.4° F., pulse 110, and respiration 16. A diagnosis of an extraperitoneal broad ligament abscess was made.

At operation a short incision was made on the right side just above and parallel to Poupart's ligament, commencing at a point a little below and farther laterally than that used in performing an appendectomy. The fascia and muscles were split in the same manner as is used in the gridiron McBurney incision. When the peritoneum was reached, the operation differed from that of an appendectomy, for instead of being opened the peritoneum was now rolled medially until the broad ligament region was exposed. A Kelly clamp was then passed down extraperitoneally to the base of the broad ligament and the two arms of the clamp were spread somewhat apart. One ounce of very thick pus immediately came into the incision. This pus was wiped away, two cigarette drains were placed down to the base of the broad ligament, and the abdomen was closed. The muscles and fascia were joined together around the drains and the opening was closed with silk.

The patient had a fever for forty-eight hours after the operation and her temperature fell to normal. She was discharged on the sixteenth day, having no pain and no elevation of temperature. Her further postoperative convalescence was uneventful.

The technic that I used in performing this operation was essentially that described by Cullen, in 1917.

the history of dysuria and the finding of pus in the urine I decided to examine the patient cystoscopically before operating on her. Moreover, the consistency and shape of this mass suggested to me that it might be dealing with something that was not an ovarian neoplasm. I examined the patient cystoscopically and placed catheters in both kidneys. The specimen coming from the right kidney did not contain pus or blood and gave a negative culture, but the one coming from the left side was filled with pus and blood and on agar-agar gave a heavy growth of the colon bacillus. The differential functional test showed that in half an hour the right kidney was excreting 40 per cent of phenolsulphonphthalein, the left only 3 per cent. A plain roentgenogram and pyelogram, it was hardly possible to force a small probe through the ureteral lumen.

small stones which had not shown in the roentgenogram. There was considerable pus in the pelvis of the kidney. Figure 4 shows the kidney after it had been removed and opened. It can be seen that there had been marked degeneration of the organ. The ureter entered the pelvis at a very acute angle and the ureter was almost entirely occluded by inflammatory tissue. As may be seen in this illustration, it was nearly impossible to force a small probe through the ureteral lumen. The patient made a good recovery from the operation and today is enjoying very good health.

I am reporting this case to show that it is only through careful study that one can avoid mistaking a pelvic kidney for a tumor arising in the peritoneal cavity from the adnexa. For two reasons it is important not to make this mistake. First, it is usually possible to remove these pelvic kidneys without entering the peritoneal cavity. Secondly, and this is to be particularly emphasized, if a surgeon should unexpectedly come on an infected pelvic kidney when he thought he was operating on an ovarian cyst or tumor, he would hesitate about removing that kidney no matter in what condition he found it, because, without having done a differential phenolsulphonphthalein test before opera-

tion, he could not possibly be sure about the function of the other kidney. Unwittingly he might, in such a case, remove the better of the patient's two kidneys or in rare cases her only one.

Case 3.—Another patient showing a different extraperitoneal pelvic condition was referred to me in 1926 by Dr. Caleb Atherton. Her only complaint was of excessive menstrual periods. On examination I found that she had an umbilical hernia and a firm tumor filling the entire lower abdominal cavity which could not be separated from the uterus. The cervix was normal and there was no pelvic tenderness. A midline incision was made, extending from below the umbilicus to the symphysis, the fascia was opened in the midline, and the rectus muscles were separated. To my surprise, I found that the large tumor which had been thought to be a uterine fibroid lay entirely outside the peritoneal cavity. It extended from the region of the bladder to within a few centimeters of the navel. The rectus muscles and their fascias were quite distinct from this tumor and were not even adherent to it. The base of the tumor reached to and rested on the bladder but was only lightly adherent to it. The tumor was gray and had a definite capsule. Although situated in the middle of the peritoneal tissue, it derived its blood supply from vessels entering it from the two sides. Removal was effected without difficulty. The peritoneal cavity was then entered. A large piece of omentum was found caught in the umbilical hernia. The uterus was normal in size and did not contain any fibroids; the large peritoneal tumor had pressed it backward into a position of retrogression. The fallopian tubes and the ovaries were normal. The round ligaments contained no myomas or adenomyomas from which the large peritoneal tumor might have arisen. Inspection from inside the abdominal cavity of the portion of the peritoneum against which the tumor had rested showed nothing unusual. Since the patient was 43 and had given a history of excessive uterine bleeding, and since the peritoneal cavity had already been entered, a high supravaginal hysterectomy was performed. The umbilical hernia was then corrected in the usual way. The patient stood the operation well and three weeks later left the hospital in good condition.

The pathologic report stated that the uterus was of normal size and, grossly, was not abnormal. Microscopic examination of the endometrium showed only moderate hyperplasia. The tumor removed from the peritoneal tissue of the lower abdomen was ovoid, weighed 600 Gm., and measured 14.5 by 9 by 10 cm. Its external surface was gray and presented everywhere an unbroken capsule. Nowhere was there any definite pedicle or stalk leading from the tumor. The cut surface revealed for the most part the whorl-like appearance of a myomatous growth. Scattered through the firm, opaque, grayish white tissue were islands of semisolid, spongy, translucent material, such as is associated with hyaline degeneration in a myomatous growth. The microscopic section showed smooth muscle tissue which in places was associated with considerable hyaline degeneration. The external capsule, which nowhere had been broken through, was made up of fibrous tissue. There was no evidence of a malignant condition. The diagnosis was fibromyoma of the utractus.

Figure 5 shows this tumor as it was found at operation. One can easily see that it was extraperitoneal. This illustration is taken from an article in which I reported all the cases in the literature of solid tumors of the urachus. There have been reported, including my own, only twenty cases of solid tumors arising from the urachus, and in every instance, except mine and one other, the tumor was malignant. Urachal cysts, however, occur much more frequently than solid tumors of the urachus and should be thought of when one encounters tumors lying in the midline of the lower abdomen which cannot be definitely proved to be within the peritoneal cavity. Cullen's book on the umbilicus

gives a detailed account of all the urachal cysts recorded up to the time of the publication of his article.

Another class of extraperitoneal conditions which one occasionally encounters are the retroperitoneal fibromas, lipomas and sarcomas. These tumors are apt to arise in the loose connective tissue behind the peritoneum near the kidneys and, as they grow, to push the peritoneum forward. They are noted for the tremendous size attained by some of the benign tumors. The largest human tumor of which there is any authentic account was one of these neoplasms. It was reported, in 1851, by Buckner and weighed 268 pounds (121.5 Kg.). In the Warren Anatomical Museum at Harvard University there is a daguerreotype made of this tumor while the patient was alive and also a detailed account of the history of the case and of the partial autopsy that was performed. As the abdominal viscera, including the pelvic organs, were all palpated through an opening made after death into the peritoneal cavity and found to be normal, there can be no doubt that the tumor had arisen extraperitoneally.

Case 4.—Less common than the solid retroperitoneal tumors are the retroperitoneal cysts. During the past year I had under my care a patient who had noticed a lump in her abdomen which had been present only one month. As she was an untrained woman, it was impossible to make a satisfactory pelvic examination without an anesthetic, but on abdominal palpation one could feel a mass in the middle of the abdomen, which extended from about 5 cm. above the umbilicus to an equal distance below it and laterally reached about 4 cm. on either side of the median line. On deep palpation the mass could be moved slightly. I made a note that the tumor was probably a fibroid that was attached to the uterus by a long pedicle, but because of the location of the mass and its general consistency I felt that I might be dealing with something quite unusual.

At operation the uterus, tubes and ovaries were found to be perfectly normal. The middle portion of the abdominal cavity presented a striking appearance. There was a spherical tumor present in the retroperitoneal tissue which was causing the posterior peritoneum to bulge forward. Several loops of small intestine were adherent over this tumor. The tumor seemed to lie over the lower part of the vertebral column and extended down to the promontory of the symphysis. An incision was made through the posterior peritoneum and by careful sharp and blunt dissection the tumor was gradually freed from the large vessels of which it lay and to whose outer coats it was adherent. The pathologic report of the tumor showed that it was a thin walled cyst, not containing any evidence of malignancy or of structures suggesting that it might be a dermoid. Indeed, on microscopic study no epithelium was seen either covering or lining the cyst. Figure 6 shows its appearance and size before it was opened. The scale shown is marked in inches.

The patient made a satisfactory recovery and on the fourteenth day was up waiting to return home, when she suddenly developed that most tragic of all surgical complications, a pulmonary embolism, from which she died in less than five minutes. At the operating table, I had remarked as I dissected the tumor from the large vessels that in this patient there was unusual danger of the development of a pulmonary embolism. unquestionably, the pressure of the growing cyst on the large pelvic veins, and the unavoidable trauma of the operation, together with the stasis following operation, were the factors bringing about this fatal outcome.

A final group of extraperitoneal conditions which should be mentioned as possibly causing serious diagnostic errors through being mistaken for visceral lesions are the tuberculous extraperitoneal pelvic abscesses. One is not likely to mistake the tuberculous abscess arising from bone tuberculosis for anything else.

However, I remember an occasion when a child was rushed into a hospital by a competent surgeon under the impression that she had a strangulated femoral hernia. It was only by careful examination that psosas spasm and limitation of motion were detected. A roentgenogram showed marked tuberculous destruction of two lumbar vertebrae.

As the last case in this series, I report an extraperitoneal tuberculous pelvic abscess, which did not arise from tuberculosis of the spine or hip and which might easily have been mistaken for an intraperitoneal condition:

Case 5.—T. J., a colored woman, aged 18, was admitted to the University Hospital, May 1, 1929, complaining of a lump in the right lower quadrant of the abdomen. The past history had no bearing on the present illness. There was no history of chronic cough or hemoptysis. The patient was married but had never been pregnant. The gastro-intestinal and urinary histories were entirely negative. The menstrual periods came regularly every twenty-eight days, were of three days' duration, and were unaccompanied by pain. There had never been any metrorrhagia. One year before the patient was admitted to the hospital, she had noticed a lump in the lower right side of the abdomen. At first the tumor caused the patient only slight discomfort, but in the three weeks before she entered the hospital there had been a definite throbbing pain in the lower part of the abdomen and during this time she had had numerous night sweats. Careful physical examination of the patient's lungs showed no evidence of pulmonary tuberculosis, so the night sweats were thought to be due to the abdominal condition. The temperature was 100 F., the pulse 110, and respirations 16 to the minute. The white blood count was 10,000, with 81 per cent polymorphonuclear leukocytes. On abdominal examination the mass could be felt in the right lower quadrant of the abdomen, about 2 cm. above Poupart's ligament. It was about the size of a lemon and was moderately tender. Pelvic

S. Buckner: Ohio State M. Tr., 1851.
examination showed the uterus to be of normal size; it could be moved without causing the patient any pain. The right adnexa could not be outlined, because the tenderness over the lower abdomen made a satisfactory bimanual examination impossible. There were no signs of gonorrhea, such as a urethritis or Bartholinitis. The movements of the right hip and of the spine were perfectly free, so that a tuberculous pyosalpinx abscess seemed unlikely. Although the patient did not give a history of recent abortion, it was my impression that the condition was either a broad ligament abscess or an extraperitoneal dermoid. Dermoids have been reported to arise in the broad ligament and after they reach sufficient size to cause just such an abdominal swelling as this patient had.

May 5, 1929, the patient was operated on. Considering the tumor to be extraperitoneal, I made an incision parallel to and above Poupart's ligament. The fascia of the external oblique was divided and the muscle fibers of the deep muscles were separated. Without opening the peritoneal cavity, I came down on and broke into a walled-off abscess. Considerable caseous material poured out. Two cigarette drains were inserted down to the base of the abscess cavity and the abdomen was closed in layers. Pathologic study of the material obtained from this abscess showed typical tuberculous caseation with a moderate number of giant cells present. Apparently the patient had a tuberculous involvement of the mesentery or iliac glands and these glands had broken down, with the development of an abscess which pointed above Poupart's ligament. The typical pyosalpinx abscess that develops from tuberculosis of the spine or hips usually points below Poupart's ligament instead of above it.

I do not know whether the patient on admission had an active early pulmonary lesion, which was not detected, or whether the tuberculosis in the pelvic glands was the primary focus from which the infection spread to the lungs. In any event, the convalescence was complicated by a continuous elevation of temperature, and four weeks after operation tubercle bacilli were found in the sputum, although the physical signs of pulmonary tuberculosis never became marked. She was then transferred to the City Tuberculosis Hospital.

The incision in the right side of the abdomen drained for about six weeks and then healed. During the past four months the patient has had no abdominal symptoms and no trouble from the abdominal incision. She has never developed any bladder symptoms or had any pus in the urine. She has never shown any limitation of movement or other symptoms or signs of bone tuberculosis. The gynecologic history and examination were entirely normal. There have never been any symptoms or physical signs of intestinal or peritoneal tuberculosis. At the present time, six months after the operation, the pulmonary condition seems to be arrested and the prognosis is good.

In this case, by recognition of the extraperitoneal nature of the condition, with operation accordingly, the patient was saved from having tuberculous peritonitis. The diagnosis was made by peritoneal aspiration, but tuberculosis has been ruled out as being present. The patient has been discharged from the hospital.

As I stated in the beginning of this paper, no new condition or method of treatment is brought forth. All that I have said merely constitutes a plea that we should never forget that extraperitoneal pelvic conditions are found from time to time in women. It is hoped that by the cases reported it has been shown that the recognition and proper treatment of these conditions may be a matter of great importance.

Medical Arts Building.

**Clinical Notes, Suggestions and New Instruments**

**TRAUMATIC AMPUTATION OF THE THIGH, COMPLICATED BY BOTH TETANUS AND GAS GANCRENE, WITH RECOVERY**

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A woman, aged 21, admitted to the Roosevelt Hospital, Feb. 16, 1929, immediately after an automobile accident, had sustained a compound comminuted fracture of the left femur at the junction of the middle and lower thirds of the shaft with such extensive destruction of the soft parts and avulsion of the skin that there was little, if any, circulation below the site of injury. The muscles and fat were ground in dirt which I learned later came from the bridle path in Central Park.

The patient was in severe shock, and the first treatment was directed toward this condition. She reacted well, and in two hours the systolic blood pressure had risen from almost nothing to 110. She had already been given the usual prophylactic dose of 1,500 units of tetanus antitoxin. She was taken to the operating rooms, and under ether anesthesia the wound was carefully cleansed and debrided of all dirt and devitalized tissue. The skin and subcutaneous tissue had been torn loose well up toward the groin anteriorly, and posteriorly from the mid thigh down below the popliteal space. The structures in the popliteal space were exposed as if they had been dissected out. The popliteal artery was intact but did not pulsate. It was evidently thrombosed by the trauma. The femur fragments were held in exact position by a steel six screw plate. Numerous Carrel-Dakin tubes were placed so as to irrigate the wound thoroughly, and the skin was only partially drawn over the denuded areas. A posterior split was used for immobilization. The general condition improved during the next twenty-four hours, but gangrene started in the toes. During the next day it spread with astonishing rapidity up to the knee. The whole lower leg was dark brown and was infiltrated with gas bubbles. Gas appeared in the wound, and the skin flaps took on a bronze hue. Cultures from the copious wound discharge showed Bacillus welchii, with numerous other pyogenic organisms. The patient's temperature had risen to 105.5° F., and the pulse rate to 140. Under nitrous oxide anesthesia a guillotine amputation was done at the mid thigh, leaving the wound wide open. The original wound was full of gas and partially gangrenous tissue, and the amputation was done just high enough to avoid most of this. Numerous Dakin tubes were placed in the open cleavage planes between the muscles and underneath the skin flaps.

Fig. 6.—Retropitoneal thin-walled cyst having no evidence of malignancy and no structures suggesting that it might be a dermoid. The scale shown is marked in inches.