diagnosis, just as herniotomy was now performed in case of doubt. The technique of abdominal section had reached such perfection that this course was not only justifiable, but absolutely called for.

IX.—GILBERT BARLING, M.B., F.R.C.S.,
Assistant Surgeon Birmingham General Hospital.

MR. GILBERT BARLING thought that the successful treatment of acute intestinal obstruction would only be attained by much earlier resort to operation than in the past. Although with improved methods, such as the use of Senn's plates, or his method of invagination, a few cases of gangrenous or perforated intestine might be saved, the majority of cases would not be rescued in this way. In reflecting on the cases he had seen he could not call to mind any instance in which regret was called for because of too early interference, but of the converse many. He wished especially to draw attention to a point in the treatment of those cases where a precedent attack of peritonitis had produced a band of adhesion, which eventually became the cause of obstruction. In such cases it was somewhat common to find the intestine generally dilated, and its walls atrophied and feeble, owing to long continued slight interference with the transit of the intestinal contents. In such cases, when acute obstruction arose, it was insufficient to simply liberate the gut from the strangulating band. The dilated and feeble intestine had not the power to expel its contents, and the patient remained practically obstructed, and so died. To remedy this, the distended intestine should be incised and emptied, and then stitched up again.

DR. GREIG SMITH'S REPLY.

DR. GREIG SMITH replied on the whole discussion, and congratulated the meeting on its success. He was pleased to find that there was a general consensus of opinion in favour of enterostomy for suitable cases. But most of the speakers seemed to have failed to grasp what was really the main object of his paper, namely, an advocacy of intestinal evacuation and drainage in cases of great distension, this proceeding lasting only over an hour or two, and being carried out without anaesthesia. Dr. Greig Smith described his proceeding in detail, and urged its advantages on the meeting. He criticised adversely all groping or exploring inside the abdomen. If the clinical signs were sufficiently studied the surgeon would nearly always be able to put his finger on the seat of obstruction. He further described and elucidated the methods he recommended for finding the cause of obstruction, and, after criticising certain views enunciated by some of the speakers, finally pleaded for a closer attention to the individual peculiarities of the cases, and a corresponding modification of the details of the operation.

SERIES OF CASES OF SUPRAPUBIC LITHOTOMY WITH IMMEDIATE SUTURE OF THE BLADDER IN TEN; WITH DRAINAGE IN EIGHT, AND WITH PROSTAT- ECTOMY IN FOUR.

*Read in the Section of Surgery at the Annual Meeting of the
British Medical Association held in Birmingham, July, 1890.*

By A. W. MAYO ROBSON, F.R.C.S.,

Honorary Surgeon Leeds General Infirmary; Honorary Consulting Surgeon
Batley Hospital; Lecturer on Practical Surgery in the Yorkshire
College; and Examiner in the Victoria University.

ALTHOUGH suprapubic lithotomy cannot be compared with the lateral operation in rapidity and brilliancy, to my mind it presents so many advantages, that in all cases of stone unsuitable for lithotomy, I employ it in preference to any other.

The following consecutive series of 18 cases without a death, in patients whose ages varied from 2 to 71 years, will serve to support my argument; but it is also necessary that I should give some grounds for my belief:—

a. The operation can be carried out with scientific accuracy and certainty; the anatomical relations of the parts varying so little that with ordinary care there is no danger of making a mistake.

b. It can be performed with safety by surgeons who have only occasionally to perform lithotomy.

c. It is the only operation universally applicable to every size of stone.

d. It can be performed antiseptically, and the parts can be kept aseptic.

e. In old subjects, the interior of the bladder can be thoroughly explored, and if necessary an enlarged middle lobe of the prostate can be removed at the same time.

f. In a sacculated bladder, it is the only method by which the bladder can with certainty be cleared.

g. In a healthy bladder, the vesical wound can be closed with certainty and safety, and where the bladder is not healthy, or where for some reason or other it is not thought desirable to close it at once, drainage can be employed.

The only disadvantages—of its taking rather longer and giving a little more trouble—are not of much moment in these days, when anaesthetics and detail in surgery are the rule.

The details of the operation are so well known that it is unnecessary in a paper of this kind to enter into them, except to mention any slight variation from the ordinary course. If there be cystitis, I wash out the bladder with a warm solution of boracic acid ($\frac{1}{2}$ ounce to a pint) before beginning the operation. After drawing off the urine, the catheter is retained until the rectal bag is introduced and distended, as otherwise it may be difficult to insert a catheter after the rectal bag is full.

In distending the rectal bag, which is introduced by someone not otherwise helping in the operation, I usually inject about 3 ounces of water in young children, and 8 to 10 ounces in adults, using less at times, but very seldom exceeding that amount, thus avoiding the dangers of over-distension; moreover, as pointed out by Dr. Garson, to inject a large amount into the rectum defeats the object for which it is introduced, namely, the making prominent the bladder. As regards distending the bladder, I am guided by circumstances as to the amount, being content when I can feel the rounded outline of the bladder between the pubes and the umbilicus; usually I inject about 5 ounces in children, and 10 to 15 ounces in adults. Boracic solution is invariably used. After the bladder is distended the catheter is withdrawn and a piece of tape tied round the penis to prevent the fluid returning.

With regard to suturing the bladder, I believe Case 1, which was operated on in 1886, and shown to the members of the Leeds and West Riding Medico-Chirurgical Society, was one of the earliest cases in which the bladder was sutured after the operation of suprapubic lithotomy; and in that case the patient was up and well at the end of the week, the catheter never being employed after the operation.

It will be noticed that ten of the series were treated by immediate suture of the bladder, and out of this number in only one did the sutures give way. In this case the bladder was so deep as to be almost out of reach of the finger, and the wound was closed imperfectly, but the drainage tube, placed between the edges of the linea alba, effectually prevented extravasation. This case was the only one in which the catheter was employed after suturing the bladder.

The sutures I employed were No. 00 chromicised catgut, which were passed through the outer coats of the bladder, avoiding the mucous membrane. The continuous suture was not employed. It simplifies the manipulations if a temporary suture be passed through the outer tissues of the bladder on each side of the intended incision before it is opened; the edges of the wound in the empty bladder can then be brought up close to the external wound. The patient is encouraged to pass his urine afterwards unaided by the catheter, and, as a rule, there is no difficulty.

In certain cases I have felt so confident of the vesical incision being efficiently secured, and of the whole wound being aseptic, that I have not thought it necessary to leave a drainage tube in the superficial incision, but, as a rule, I consider it a wise precaution to introduce a small tube superficially. Immediate suture of the bladder is especially applicable, and is very easy in young adults and children, and in thin persons generally. Where there is an accumulation of fat in the abdominal walls it is feasible but more difficult to accomplish, since the bladder is a long way from the surface.

The bladder should not be sutured in cases of cystitis or where the edges of the vesical wound are bruised, as in the extraction of a very large stone or in the manipulations necessary for the removal of an enlarged prostate. After draining the bladder, it hastens recovery and promotes the healing of the wound to allow the patient to get out of bed as early as is consistent with his general condition—often at the end of the first or in the second week—and then the edges of the abdominal wound can be drawn together with strapping.

I.—GROUP OF CASES IN WHICH PRIMARY SUTURE OF THE BLADDER WAS PERFORMED.

1. J. B., aged 4; admitted to infirmary, October 6th, 1886. History of stone for six months. October 14th. Suprapubic lithotomy performed; four ounces of warm boracic solution injected into bladder; small Barnes's bag placed in rectum and distended with water; lithic acid stone, weighing 40 grains, removed; bladder wound closed with three chromic catgut sutures, superficial wound closed and small drainage tube inserted between the edges of the linea alba, not reaching to the bladder. Blood-stained urine passed in the evening. Catheter not used. October 16th. Tube removed. 19th. Wound quite healed; temperature normal throughout. 26th. Made out-patient; quite well.

2. W. C., aged 4; admitted January 3rd, 1887. History of stone for eight months. January 6th. Suprapubic lithotomy performed; four ounces of boracic solution injected into bladder; small Barnes's bag placed in rectum; stone extracted weighing 35 grains and measuring 2 by $1\frac{1}{2}$ centimètres, lithic acid; bladder closed with chromic catgut sutures, skin edges sutured, and small drainage tube inserted superficially. January 8th. Dressed; no urine through wound; catheter never used. 10th. Dressed and tube removed; wound almost healed, but edges a little red. 13th. Wound healed; urine normal.

3. J. C., aged 48; admitted June 27th, 1887. History of stone for twelve years. Patient extremely obese. June 30th. Suprapubic lithotomy performed; ten ounces of water in rectal bag; ten ounces of boracic solution in the bladder; large lithic calculus extracted; bladder washed out, and closed with nine chromic catgut sutures; abdominal wound closed with wire and catgut; superficial drainage tube inserted into wound. The bladder was very far from the surface, and the sutures had to be applied by means of a curved needle in handle. June 30th, 8 P.M. Catheter used, and bloody urine drawn off. July 1st. Catheter used three times. 2nd. Urine oozing through wound, which was at once opened out by removal of sutures, a drainage tube being passed through it into the bladder. 13th. Urine passed by urethra. August 2nd. Made an out-patient, with wound almost healed. 15th. Patient well and wound healed.

4. A. R., aged 7; admitted July 11th, 1888. History of stone for three years. July 12th. Suprapubic lithotomy performed; eight ounces of water in rectal bag; bladder distended with eight ounces of boracic solution; stone extracted; bladder stitched with three chromic catgut sutures; superficial wound closed. 14th. Dressed; healed by first intention. 18th. Allowed to be out of bed. 28th. Sent home cured.

5. Wm. H., aged 13; admitted October 5th, 1888. History of symptoms as long as he can remember; much aggravated during the last six or seven weeks. October 11th. Suprapubic lithotomy performed. Five ounces of water in rectal bag, and 8 ounces of boracic solution in bladder. Mucous membrane and fibrous coat of bladder sutured separately; small drainage tube in superficial wound. Stone composed of oxalate of lime, $\frac{1}{2}$ in. by $\frac{1}{2}$ in., disc-shaped, with round edges. 13th. Dressed; two stitches and the small tube removed. 17th. No urine through wound, which has healed by first intention, except where the tube was. 18th. Patient up. 20th. Wound granulating. 29th. Made out-patient. December 13th. Wound perfectly healed, no difficulty in micturition.

6. T. S., aged 50; admitted March 20th, 1889. History of stone for ten years. March 28th. Suprapubic lithotomy performed. Stone extracted weighing 4 drachms, 54 grains, and measuring $1\frac{1}{2}$ by $1\frac{1}{2}$ inches; lithic acid; bladder stitched up and wound closed; small superficial drainage tube employed. Passed urine three hours after operation. April 1st. Dressed; tube and sutures removed. 10th. Wound healed; allowed to get up. 17th. Made an out-patient.

7. G. H. T., aged 14; admitted September 28th, 1889. History of stone for three years. Urine ammoniacal and mixed with phosphates. October 3rd. Suprapubic lithotomy performed. Stone broken by forceps; fragments washed out; bladder sutured; muscles and skin drawn together. Superficial drainage tube used. Stone size of small walnut; small lithic acid nucleus, with external part composed of very soft phosphatic material. 9th. Bladder has been washed out daily with warm boracic lotion. 19th. Wound quite healed; no difficulty in micturition. Made an out-patient.

8. E. W., aged 12; admitted September 3rd, 1889. History of stone for nine months. September 12th. Suprapubic lithotomy performed. Primary suture of bladder. No drainage tube em-

ployed. Stone removed weighing 2 drachms, barrel-shaped, 1 in. by $\frac{1}{2}$ in. September 14th. Dressed. 21st. Wound healed.

9. J. L. W., aged 2 years; admitted April 22nd, 1890. History of stone three months. May 22nd. Suprapubic lithotomy performed. Lithic acid stone size of horse bean removed; four sutures in bladder; small superficial drainage tube in wound. 24th. Dressed; tube removed. 30th. Dressed; superficial stitches removed. Healed by first intention.

10. James G., aged 23rd; admitted June 17th, 1890. Symptom of stone for two years. Urine alkaline, specific gravity 1020; contains a little albumen. June 19th. Suprapubic lithotomy performed. Ten ounces of fluid in rectal bag; 12 ounces of boracic solution in bladder. Bladder sutured with six catgut suture. Abdominal wall sutured and superficial drainage tube inserted which was removed the next day. Oxalate of lime stone weighing 153 grains. 25th. Dressed; healed by first intention, except where drainage tube had been; patient up. 30th. Healed; made out patient.

II. GROUP OF CASES IN WHICH PROSTATECTOMY AS WELL AS SUPRAPUBIC LITHOTOMY WAS PERFORMED.

11. B. H., aged 67. History of stone for four years. Urine normal. December 15th, 1887. Suprapubic lithotomy performed; 12 ounces of water in rectum; 10 ounces of boracic solution in bladder. Lithic acid stone removed weighing 322 grains, and measuring 2 inches in length. Middle lobe of prostate removed; drainage tube inserted December 21st. Tube removed December 24th; urine passed by urethra. January 31st. Made out-patient. Patient at present time in good health and working at his old occupation.

12. J. B., aged 63; admitted June 6th. Symptoms of stone for eight years. Sixty-five ounces of alkaline urine removed. June 6th. Suprapubic lithotomy performed; 10 ounces of water in the rectum; 12 ounces of boracic solution in the bladder. Fifty calculi removed, largest $1\frac{1}{4}$ inches long. Two masses of adenoid tissue removed from either side of urethral orifice. Drainage tube inserted June 9th; tube removed August 3rd. Patient discharged cured, and is at present time quite well.

13. C. E., aged 62. Symptoms for several years. September, 1888. Middle lobe of prostate and three faceted calculi, about the size of large filberts, removed. Bladder drained. Patient now in perfect health, and performing his duties as a working man.

14. J. W., aged 66. Four years' history; catheter life greater part of time. Negatively sounded for stone on several occasions by experienced surgeons. March 22nd, 1890. Suprapubic cystotomy performed; 6 ounces water in rectal bag, and 12 ounces boracic solution in bladder; three stones removed from pouch behind prostate, one the size of a pigeon's egg, two the size of sparrows' eggs; middle lobe of prostate also removed; bladder drained; tube removed on fourth day. Patient up in second week; wound healed within month, and urine passed naturally. Some cystitis still persisted in July, but otherwise the patient was well.

III.—GROUP OF CASES IN WHICH THE BLADDER WAS DRAINED.

15. J. C., aged 38; admitted August 16th, 1886. History of stone for six years; urine alkaline, specific gravity 1018, containing pus. August 19th. Suprapubic lithotomy performed; stone, size of pigeon's egg, removed from pouch over pubes. Drainage tube inserted August 23rd. Tube removed September 6th. Urine dribbling through wound and passing by urethra. September 23rd. Bladder washed out daily with boracic solution. October 1st. Wound healed; pus still in urine. 16th. Made an out-patient. The cystitis gradually disappeared, and the patient regained good health.

16. J. D., aged 41; admitted October 10th, 1887. History of stone for six years; had passed a number of small calculi. October 13th. Suprapubic lithotomy performed; stone removed 2 in. by $1\frac{1}{2}$ in. Drainage tube inserted. October 16th. Tube removed. 25th. All the urine passed by the urethra. 23th. Wound healed.

17. J. W., aged 59; admitted July 9th, 1888. History of stone for two years. July 12th. Suprapubic lithotomy performed; drainage tube inserted; stone removed measuring $1\frac{1}{2}$ in. by 2 in. by $\frac{1}{2}$ in., consisting of oxalates embedded in uric acid and covered by a deposit of phosphates. 14th. Tube removed. August 14th. No urine through wound. Patient discharged cured.

18. D. S., aged 71; admitted April 15th, 1890. History of stone for three years. April 24th. Suprapubic lithotomy performed; drainage tube inserted. 26th. Tube removed. May 17th,

Passing practically all the urine through the urethra, a few drops coming through the wound. 24th. Wound healed. Patient apparently quite well.

ON THE ALLEGED DIFFERENCE BETWEEN MALE AND FEMALE RESPIRATORY MOVEMENTS.

Notes of a Communication made in the Section of Anatomy and Physiology at the Annual Meeting of the British Medical Association, held in Birmingham, July, 1890.

By WILBERFORCE SMITH, M.D., M.R.C.P.

ABOUT fifty cases were represented by stethographic tracings exhibited to the Section. The instrument used was that of Burdon Sanderson, mostly in its original form; but the following modification of that instrument had in the author's hands lately afforded a great increase of convenience. He had clamped on to a massive camera-stand the limb of the stethograph which held the button and tambour for receiving the respiratory impulse, and had thus utilised the facility of adjustment to the thorax or abdomen, which the several movements of the camera stand afforded. At the same time, he had obtained, by means of a firm upright spinal rest, the requisite fixity of the trunk posteriorly.

which these tracings were obtained were all, with a view to greater precision, chosen in the mesial line anteriorly, and at the following levels, namely: (1) over the sternum in the line of the second chondro-sternal articulation; (2) over the liver below the ensiform cartilage; (3) just above and clear of the umbilicus; (4) just below and clear of the umbilicus; (5) (in many cases) midway between the umbilicus and pubes. Between the abdominal wall and the button of the stethograph there was in later experiments interposed a small curved plate of horn or a card in order to afford a firm surface. The dress was entirely loosened.

To keep the subject of experiment wholly ignorant, if possible, of the object of the process was regarded as especially important. A small group of tracings produced, illustrated the great alteration produced in the respiratory curve when the subject had unfortunately learned too much, and become conscious of the breathing process. Except to illustrate this point, such tracings were, of course, useless. In several cases the results were checked by taking second or third tracings at later dates. Adopting these precautions, it was not thought essential to take tracings at several levels simultaneously.

Certain general results belonging to nearly all the cases, whether of men or women, are as follows: (1) At the sternal level, there is shown in both sexes free respiratory movement. That there should not appear a comparatively greater sternal movement in females does not quite accord with the impression which observation without the stethograph of women in their usual dress would have sug-

It was plain that to speak of "thoracic" or "abdominal" respiration without further definition was extremely inexact; yet he had been unable to discover that any precise definition had been hitherto adopted. The points on the thorax or abdomen from

gested. The author had not observed whether, as is possible, this movement is diminished in women when the dress is loosened for stethographic experiment, and thus fairly equalised it with the sternal movement in men. (2) Over the liver, there was constantly