inasmuch as the dilatation of the gut is not produced by distension with gas. The introduction of the finger, or even of a tube, does not cause it to disappear. It may vanish after continued manipulation, and, so far as I have noticed, disappears under an anæsthetic. It is vaguely associated with some trouble higher up in the alimentary canal, and usually in the colon. It is not uncommon in stricture of the colon, but is of little diagnostic value. I have found it very marked in a case of perityphlitis, and have met with it after abdominal operations involving the bowel. It is hardly a paralytic condition, and seems indeed to be rather allied with the states of the colon above described.

Finally, surgery affords many illustrations of that curious transmigration of pain which is common in many abdominal troubles, and which may play a part in intestinal neuroses. In acute trouble involving the small intestine, as for example strangulation in a hernia, the pain is very usually referred to near the root of the superior mesenteric plexus. The operation of nephrorrhaphy provides many examples of that strange renal pain which is experienced over the outer side of the hip and thigh, and in the heel or sole of the foot. In one case in which my ligatures passed possibly deeper than usual, and were drawn tighter than usual, the pain in the heel persisted for some months.

In a case of stone in the kidney the pain may be referred to the opposite and sound organ.

In perityphlitis the pain in certain stages, and especially in first attacks, may be referred to the opposite side. In one instance pressure upon a diseased appendix during a quiescent period produced pain in the corresponding point of the left iliac fossa.

Curious colicky pains in the bowel appear to vanish mysteriously after operations which have rid the patient of some disease of the gall bladder, kidney, or ovary.

Recently I was removing a piece of redundant gall bladder in a conscious patient upon whom I had performed cholecystotomy some weeks before. The patient felt no pain in the wound, but experienced intense pain in the back and in the "bowels" on the left side of the abdomen, below the level of the umbilicus. Pressure upon this part relieved the distress.

Reference may be made to the interesting experimental investigations of Bokai³ and Luderitz⁴ on peristaltic movements, and to papers by Stein⁵ and André⁶ on intestinal neuroses.

CLINICAL LECTURE

ON

RETENTION CYSTS OF COWPER'S GLANDS AS A CAUSE OF CHRONIC GLEET, SPASMODIC STRICTURE, ORGANIC STRICTURE, EXTRAVASATION OF URINE,

AND OF SO-CALLED "FALSE PASSAGES" IN THE BULBOUS URETHRA.¹

By E. HURRY FENWICK, F.R.C.S.,

Surgeon to the London Hospital, Surgeon to St. Peter's Hospital for Urinary Diseases.

I BELIEVE that in discovering retention cysts of Cowper's glands to be not infrequent in the adult, I have chanced upon an important clue to one of the causes of some of the more obscure and chronic affections of the deep urethra. It is true that several cases of cyst of Cowper's glands have been found in infants upon *post-mortem* examination, and that three probable cases of this disease in adults have been recorded in the literature, but it has not been shown that small-sized retention cysts do occur in the young adult, and may remain for months unsuspected as being the cause of chronic change and definite irritation of the urethral mucous membrane.

³ *Arch. für exper. Path. und Pharm.*, 1887.

⁴ *Virch. Archiv*, 1889.

⁵ *Wiener med. Wochen.*, 1892.

⁶ *Gaz. Hebdom.*, December 17th, 1892.

¹ Abstract of one of a series of demonstrations and clinical lectures upon Obscure Diseases of the Urinary Organs.

Since I have used the *aëro-urethroscopé*² I have examined some hundreds of urethrae in the inflated condition, and have paid particular attention to the pathological history of the smaller glands (Littre's) which line that canal. I have watched, month by month, the changes which chronic gleet evoke in these minute mucous glands; how they become inflamed, secrete pus, and empty themselves through their ducts; how in other instances they become distended with mucus from blockage of their ducts, and burst into the urethra by the side of these outlets or slough out bodily and leave little pits in the wall covered by a hanging bridge of fibrous tissue; how in every case as the gland bed heals the mucous membrane around it becomes thickened and contracted, and transformed into a fine rib or semi-ring of dense fibrous material, thus forming those incomplete rings which are often wrongly diagnosed as large calibre strictures. The knowledge thus gained in watching the minuter glands has been of much service in tracing the changes in the larger mucous glands, the glands of Cowper.

Two years ago my attention was suddenly arrested during an *aëro-urethroscopy* by seeing an ovoid swelling on the floor of the bulbous urethra.³ The mucous membrane covering the elevation was gelatinous and very much congested. The appearance of the projection reminded me at once of a ranula, and, as I knew that the glands of Cowper emptied themselves in this position, I recognised that I had to deal with a retention cyst of one or other of these small glands. I dipped my fine urethral knife into the tumour, guiding it through the cannula under control of the eye, and evacuated about a drachm of mucus streaked with milky pus. The edges of the incision gaped at once, and on reinflation I saw that I had laid open a loculated cyst, which extended backwards beneath the membranous urethra. This patient was only sent to me for consultation, so that I lost sight of him; but I have been fortunate enough to meet with 9 other cases, and these have afforded me fair opportunities of studying the gross changes in the cysts, and of speculating upon the influence which the diseased glands appear to exert upon the superjacent mucous membrane.

THE GROSS CHANGES WHICH ENSUE UPON BLOCKAGE OF THE DUCT OF COWPER'S GLAND.

Cowper's glands are two pea-sized yellowish-white bodies which are situated between the layers of the triangular ligament and beneath the membranous urethra. (Fig. 1.) They

Fig. 1

are embedded in the lower fibres of the compressor urethrae muscle, close against the anterior layer of the triangular ligament. Their ducts pierce this ligament, course beneath the

² Author, *Medical Annual*, 1893, p. 66; also Author, *Modern Urinary Surgery*, p. 190.

³ I would remind my readers that when the urethra is blown out with air the bulbous part of the canal is seen to become spindle-shaped, the compressor urethrae muscle contracts, and usually prevents any air entering the membranous urethra. The bulbous urethra assumes, therefore, the appearance of an ovoid bag, the mouth of which has been tied up with a string. Any bulging of the floor can then be recognised at a glance.

mucous membrane of the bulbous urethra for about an inch or more, and open either separately on each side of the median line, or join together in a common orifice. Careful aëro-urethroscopy will sometimes reveal their slit-like openings in this position if inflamed. (Fig. 2.) On blockage of the duct

Fig. 2.

either by inflammation or scarring, the gland becomes distended with mucus and the duct dilates. Gradually an ovoid or loculated cyst the size of a haricot bean or damson forms below the membranous-bulbous urethra, and projects upwards on to the floor of the bulbous section. (a, Fig. 3.) Probably,

Fig. 3.

the greater part of the swelling is at first merely a dilatation of the duct itself, but as the tension increases and no relief is obtained either surgically or spontaneously, the cyst extends backwards, makes its way through the deep or posterior layer of the triangular ligament, and bulges upwards on to the prostatic urethra. My knowledge of its capacity for further enlargement ceases here, for I have only encountered the lesser grades of these retention cysts, but if one may judge from three cases recorded in the literature of Gubler, Englisch, and Lane, much larger proportions may be assumed. In one (which I take to be an example of retention cyst), carefully detailed by Mr. Arbuthnot Lane,⁴ the cyst measured 2 inches by 1½ inch. It had burst into the prostatic urethra.

To return to my own notes. Either from access of inflammation, or tension necrosis, the cyst bursts into the bulbous urethra (Fig. 4 a a); rarely into the prostatic canal. One,

Fig. 4.

two, or more thin-edged oval openings remain on inflating the canal. They can be clearly distinguished on the floor of the bulbous urethra (Fig. 5). Through these orifices the inner aspect of the empty cyst may be viewed, its shining white loculated interior standing out in strong contrast to the red succulent mucous membrane beneath which it is placed. In some cases, after incising the opening, a No. 18 or 20 (French gauge) cannula may be inserted into the sac and its interior inflated, so that the off-shoot channels which pass posteriorly from it can be studied. In some cases, where the duct has suffered most and temporarily (?), only a thin oval opening is detected, and the track of the dilated duct can be distinguished passing backward from it along the floor of the

urethra by the gleam of whitish light which traverses the thin diaphanous wall.

Little by little, unless a surgeon thrusts the point of a bougie into the sac through its mouth and tears up its wall, contraction takes place, but the duct and orifice probably remain patulous for years.

Fig. 5.—Enlarged aëro-urethroscopic view of floor of bulbous urethra.

I have some suspicion, which is difficult to translate into a certainty, that the mucous membrane in front of these openings, is fretted and sclerosed by the escape of the discharges and regurgitations from the sac. I have seen strictures form in this position. I am sure also that the muscles—the compressor urethrae and the accelerator urinae—suffer to some extent by inflammatory transudation, for their energy becomes impaired and the urine is not freely ejected in micturition as it should be in health.

THE SYMPTOMS OF RETENTION CYSTS OF COWPER'S GLANDS.

The symptoms of inflamed prostrate, subacute cystitis, and stricture may be present coincidentally with those evoked by retention cyst of Cowper's gland, for the gonorrhoeal invasion which affects the ducts attacks also the adjacent areas of the urethra. It is somewhat difficult, therefore, to assign to their proper quarters the symptoms evoked by inflammation of these separate areas. As far as I am able to speak, the symptoms which arise from retention cysts are:

1. A chronic milky gleet, slight but persistent. It had been present in my cases from two to six years, and in evidence of it being largely dependent upon the presence of the cyst it was at once reduced upon incising and evacuating its contents.

2. A distinct though slight obstruction to the free passage of urine. Apparently this was due to the spasm which the gland excited in the compressor urethrae, for on inflating the bulbous urethra the orifice of the membranous canal was tightly compressed and the entrance of air was strenuously resisted. Part of the obstructive feeling might have been, of course, due to the narrowing of the tube from flattening of the inferior wall of the membranous urethra by pressure of the cyst. This obstruction was at once relieved by incision.

3. A dull heavy weight and pain on one or other side of the median line of the perineum at the margin of the anus, somewhat similar to the pain of chronic prostatitis, and probably often mistaken for it. This pain is liable to exacerbation by cold, alcohol, etc.; under these circumstances it spreads to the tuber ischii and down the inside of the leg of the same side. Pain over the sacrum and corresponding groin is also complained of.

These three symptoms are much increased just before the spontaneous rupture of the sac, and great relief to all is experienced on the appearance of a little rush of mucus and pus and blood from the meatus.

When the cyst has emptied itself there is a sense of tickling or fly crawling in the deep urethra, and the patient has to lift up his perineum with his hand at each micturition to empty his canal, but of course these symptoms are experienced in other troubles in the deep urethra.

THE CHRONICITY AND FREQUENCY WITH WHICH THESE CYSTS ARE MET WITH.

One of my cases presented a fully distended cyst one and a-half year, another two years, and another six years after

⁴ Arbuthnot Lane, A Compound Diverticulum in connection with the Prostatic Urethra, *Pathological Transactions*, vol. xxxvi., p. 288

contagion. I am quite unable to say how long they had been in existence, but, judging from the symptoms, I should believe it was a matter of many months.

I am also unable to hazard even a suggestion about the frequency of these cysts. They cannot be common, for I have only met with nine examples, and yet I may have easily overlooked many before I became alive to the importance of the disease. It is surprising that it is not more common, as the bulbous urethra forms a sort of depressed trap in the urethral water pipe, and irritating fluids perforce lodge here.

TREATMENT.

I have incised cysts which have not burst, by means of a fine harpoon knife introduced through the urethral cannula. I have then introduced a cannula bodily into the cyst, and have pencilled the whole wall with solid nitrate of silver, and have limited and checked the action of the caustic by means of a swab of salt solution or of cocaine hydrochlorate. The more surgical method and one which I am intending to adopt in future is to thrust a fine tenotome into the sac from the perineum, guiding it by means of a urethral cannula placed over the cyst. In this case the urethra is not opened. The sac would be then stuffed with gauze. If the cyst has already burst I enlarge the orifice and pencil the sac with caustic.

THE CAUSATIVE INFLUENCE OF THESE RETENTION CYSTS UPON DEEP URETHRAL DISEASE.

I submit, with some confidence, that retention cysts of Cowper's glands must have given rise to faulty diagnosis in the past, such as spasmodic stricture, chronic prostatitis, and false passage of the bulbous urethra. Putting aside the obvious ease with which such mistakes might occur, the cases which have come under my notice had had these incorrect diagnoses given them by surgeons of acknowledged skill. Again, there is no doubt that the retention cyst is capable in itself of creating and sustaining a chronic gleet discharge. I believe that this and other inflammatory conditions of Cowper's glands are important factors in the development of organic stricture of the membranous and bulbous urethra. It is reasonable to suppose that the mucous membrane overlying an inflamed sac will become secondarily affected by it, and that the inflammatory infiltration will ultimately lead to contraction. I have seen definite white fibrous deposits overlying the site of these sacs, and even over the mouths of the inflamed ducts. This would explain the causation of those infrequent cases of organic stricture of the membranous urethra. It has always been difficult to understand how chronic change can affect a part like the membranous urethra, which is kept permanently closed against the lodgment of irritating discharges by the tonic contraction of its embracing muscle—the compressor urethræ. Inflammatory transudation from an underlying inflamed structure, however, would readily induce those muscular, submucous, and mucous changes which on contraction would form a dense organic stricture.

RETENTION CYST AS A CAUSE OF EXTRAVASATION.

On blowing out the thin-walled cysts, and remembering how frequently stricture of the urethra is situated immediately in front of their open orifices, I at once realised how easily extravasation of urine would take place through the wall of that part anterior to the triangular ligament if any extra pressure of urine was exerted upon the urethral tube at this spot. Mr. Arbuthnot Lane⁵ has, I find, anticipated me in this suggestion but without the same strong grounds for this theory. My cases form, therefore, the important missing link in the elaborate chain of reasoning he has so admirably put together to support his theory of the causation of extravasation of urine through sacculi in the urethra.

⁵ Arbuthnot Lane, *Extravasation of Urine and Sacculi of the Urethra*, *Guy's Hospital Reports*, 1886, p. 29.

VIVISECTION: A GOOD EXAMPLE.—Reuter's agent at Zurich states that the inhabitants of that canton have rejected, by 39,476 votes against 17,297, a proposal submitted to them for the absolute prohibition of vivisection. On the other hand, a counter proposal of the Grand Council in favour of the protection of animals, with due satisfaction to the demands of science, was adopted by 35,191 votes against 19,551.

AN APPARATUS FOR THE CULTIVATION OF ANAEROBES.

By D. J. HAMILTON, M.B., F.R.S.E.,

Professor of Pathology, University of Aberdeen.

In designing any apparatus for the culture of anaerobes, the following are the chief points to be aimed at: (1) The joints of the apparatus, if such it possess, must be gas proof, so as to prevent the escape of the hydrogen which is usually employed as the artificial atmosphere; (2) the atmosphere of hydrogen must be capable of renewal from time to time; (3) there must be ready access to the medium contained in the apparatus so that it can be inoculated, or part of the culture removed.

Most of the instruments hitherto devised have been faulty in one or more of these respects. The joints are not perfectly tight, the inlets and outlets of the instrument have to be sealed off, so that access cannot be had to the interior without breaking the tubing, the gas cannot be streamed easily through the medium, or the atmosphere of gas renewed from time to time. These are all defects which render the cultivation of anaerobes more difficult than it ought to be. The apparatus about to be described is calculated to overcome them.

It will be admitted on all hands that, for gases, the mercury valve is the one which comes nearest to perfection. Provided that the glass surfaces of the valve be lubricated with glycerine or some such viscid substance, the mercury joint becomes practically gas proof, even with such a highly diffusible gas as hydrogen. The mercury valve, accordingly, is that which is employed in the apparatus about to be described.

The basis of the apparatus is an ordinary glass flask (F), provided with a long neck. The size may vary according to the quantity of medium to be employed, but one of 150 to 200 c.cm. capacity will generally be found most convenient. Into the neck of this flask is introduced a cotton plug (P), round which four strong silk threads are securely bound in such a way that they can be laid hold of with a hook, and thus aid in its withdrawal. Running through this cotton plug is a thin glass tube bent as represented in the accompanying sectional view of the apparatus. The tube is plugged with cotton at the point (p), and upon it is blown a small bulb (B). The neck of the tube above the cotton plug is filled with mercury (M) for a distance of at least an inch, and over this is poured a thin layer of glycerine (d). The remainder of the neck of the flask is occupied by melted paraffin, which is allowed to solidify. The bend of the tube at (m) is also filled with mercury, a drop or two of glycerine having previously been introduced. The medium (L) for cultivating upon, either liquid or solid, is placed in the flask; and the tube, as it dips into it, is bent in a direction away from the bulb (B). The whole apparatus is of such extremely simple construction that it can be manufactured in a few minutes from materials present in any bacteriological laboratory.

In actual use, the plug with tube running through it is introduced, at first merely for a distance of about an inch; it