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.

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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 (G). 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

is not pushed down into the position represented in the illustration. The apparatus is next sterilised at a temperature of 150 to 170° C. The plug is withdrawn, and the medium is poured into the flask by means of a funnel with a long stem. Care must be taken that the neck of the flask does not become soiled with the medium in doing so. The plug is replaced, and the medium in the interior of the flask sterilised by the usual means.

Having proceeded so far, the free extremity of the cotton plug is cut off, singed, and pushed down into position. The mercury (M) is next poured into the space above the plug. That in the bend of the tube (m) is not introduced till afterwards.

The apparatus is now ready for the deoxygenation of the medium, which, if gelatinised, should be melted in a warm bath. From 2 to 3 per cent. of grape sugar should have been added to it previous to its being placed in the flask. The stream of hydrogen is passed through it by attaching the end of the glass tube (g) to an india-rubber tube connected with a cylinder of compressed hydrogen. The hydrogen is purified by being passed through solutions of potash and pyrogallic acid. The escape gas readily bubbles through the mercury in the neck. The medium is liquefied by placing the bulb of the flask in warm water. After the gas has continued to pass for something like a quarter to half an hour, the supply is cut off, the end of the tube drawn up, and the medium is allowed to solidify by immersing the bulb in an ice bath. Any contraction which takes place in the atmosphere of hydrogen as it is cooling can be compensated by allowing a little more gas to enter. Indeed the gas may be allowed to stream through the flask during the whole time in which solidification is taking place, provided that the end of the tube is pulled upwards.

The medium is thus deprived of its oxygen, and can now be inoculated. Suppose, in the first place, that it is desired to make a surface culture. The gas supply is cut off at g, the mercury is decanted from the neck of the flask, and the plug with the tube is withdrawn by means of a hook. The silk cords surrounding the plug aid in so doing by being readily caught by the hook. The inoculation is effected by means of an ordinary platinum needle, and immediately thereafter the cotton plug is replaced, and the mercury again poured into the space above it. A thin layer of glycerine is run over the surface of the mercury, and the remaining part of the neck of the flask is filled with melted paraffin, which is allowed to solidify. The paraffin fixes the tube and prevents the mercury from running out when the flask is rotated, as afterwards described. A drop or two of glycerine is introduced into the tube at g, and the bend (m) is filled with mercury.

This being accomplished, the flask is ready for filling with hydrogen. Its neck is held by a clamp capable of being rotated and the connection with the gas supply at g is re-established. A small piece of the paraffin plug is cut out as represented at c, and a little of the mercury may be allowed to escape. The flask is now rotated backwards, that is to say, in a direction to the left of the scheme, within a compass of a little more than 45°. The result is that the mercury comes to occupy the position of the dotted line o, and so leaves part of the cotton plug exposed. Through this exposed part the gas escapes. Indeed, it is not necessary to expose the plug entirely, for the gas readily streams through the thin layer of mercury which may happen to cover it. The mercury (m) in the bend of the tube at the same time falls backwards into the bulb (B), leaving the supply tube open. The gas supply is now turned on, and escapes readily through the cotton plug in the neck of the flask. After the gas has streamed through sufficiently long, say, a quarter of an hour, the supply is cut off, and the flask turned round so as again to occupy the upright position, the result being that the mercury in the bulb (B) returns to the bend of the tube (m), and the cotton plug becomes completely covered by that in the neck of the flask. The apertures of entrance and exit are thus simultaneously and instantaneously sealed, and the gas is prevented from escaping. Fresh paraffin is poured into the vacuity left by part having been cut out.

If it is desired to allow the organism to grow all through the medium, inoculation should be practised before deoxygenation. The medium can be melted over and over again,

and the gas passed through it. When the flask is rotated, the medium, if melted, occupies the situation of the dotted line (v), but the bend on the tube brings the orifice into its midst, and causes the gas to pass through it. If the medium be a liquid, the same method of procedure is of course applicable to it.

I have generally renewed the atmosphere of hydrogen week by week. It is questionable, however, whether this is necessary.

Supposing it is desired to examine part of a culture, all that is necessary is to cut round the entire margin of the paraffin and withdraw the plug. The mercury should previously have been run off, both from the neck of the flask and from the tube. After removal of part of the culture the plug and other parts are readjusted, and a stream of gas again passed through the flask.

The advantages possessed by the apparatus are self-evident, and may be summarised as follows:

1. It is of simple construction, and can be made in a few minutes out of ordinary laboratory materials, the cost being thereby reduced to a minimum.¹
2. The atmosphere of hydrogen can be renewed as often as desired.
3. The escape of gas is prevented by the simplest and best of all valves.
4. It can be employed for surface cultures.
5. From the wide expanse afforded by the medium in the flask it can be used for fractional cultivation, and hence has many of the advantages without the disadvantages of Petri's plates, or other like expedient.

PATHOLOGY OF VACCINIA AND VARIOLA.²

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BEFORE referring to the most recent work on the pathology of variola in detail, it may be well to briefly recapitulate the subject matter of the paper which I had the honour of bringing before the notice of this Section at the meeting of the Association, held at Bristol in 1894.

I there stated that the main dispute with reference to the pathology of vaccinia has always centred round the term *variola vaccinae*, "small-pox of the cow," given to the disease in the first instance by Jenner. Consequently the important question remains as before, whether vaccinia is or is not one with small-pox.

I prefer in this connection, the phrase "one with small-pox," since it matters little from my point of view, whether small-pox on its transference from man to the bovine animal becomes "transmuted," as the phrase is, or is merely modified, as some would maintain. If I were informed on good authority that small-pox and vaccinia are descended both of them from a common stock: from an ancestor for instance which resembled vaccinia far more than it resembled small-pox, I should not be disturbed by the proposition. I should perceive indeed that the seeming vaccinia obtained in the calf by inoculation of small-pox matter into that animal might after all be but a reversion to an antecedent type, and I should be calling to mind a fact of universal experience, namely, that vaccinia—however it may have arisen in the past, or is made to appear in the present—exhibits little tendency to "sport" (as for instance by manifesting a "generalised eruption") in the direction of small-pox. I could understand, I mean, a highly differentiated form reverting, under artificial conditions, to a little differentiated form; though the reverse process, readily or frequently repeated *per saltum* would indeed surprise me.

In my former paper, I stated that the problem has been attacked from two separate points of view:—1. Experimental work having for its object the production—if that be possible—in the bovine animal, by inoculating it with small-pox

¹ Mr. Hume, 1, Lothian Street, Edinburgh, supplies the instrument complete.

² Read in the Section of Pathology at the annual meeting of the British Medical Association, held in London July-August, 1895.