

others, to this condition of simple hypertrophy of the epithelium, there is added a further abnormality, viz., the thickened epithelium shows villous or papillary projections jutting into the lumen of the duct (Fig. 13). In many cases this process has led to the complete filling up of



FIG. 13.—Adenomatous growth originating in connection with a duct of the mamma of a bitch ( $\times 40$ ). In the centre of the figure there is seen the lumen of a large duct, largely filled up by villous-like process of epithelium. Towards the left upper corner of the figure the adenomatous growth appears to have extended into the connective tissue of the gland.

the duct with epithelium arranged in a distinctly adenomatous manner. Some of the ducts thus altered are dilated to the calibre of a crow quill. A section of such a duct at the first glance simulates the appearance of an ultimate lobule of a gland. Externally it is bounded by a distinct fibrous ring—the original fibrous wall of the duct. Within this there is an appearance as of gland acini and tubes, bounded by epithelium, and cut in various directions. The epithelium, however, has not associated with it either connective tissue or vessels, and the connection between the peripheral layer and the fibrous connective tissue upon which it rests is so slight that in sections the whole epithelial mass sometimes drops out.

At certain parts it seems, however, as if this atypical epithelial growth had burst outwards into the surrounding connective tissue, and were proliferating there, so as to produce irregularly disposed masses of epithelial cells, generally still showing the adenomatous arrangement, but sometimes appearing as solid strings.

This interesting behaviour of the lining epithelium of the larger ducts appears to be a subsidiary process in the gland. The same thing to a less extent is met with in Tumours XVIII. and XIX., but in all three tumours the main pathological process appears to be a fibrous induration with consequent destruction of the gland acini.

*(To be continued.)*

## AN IMPROVED STEAM STERILISER.

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IN bacteriological work the steam steriliser is an indispensable piece of apparatus. The most common instrument of the kind is that designed by Koch. This is a cylindrical metal vessel with a close-fitting lid, and with a wire-grating carried across the cylinder at a depth of about 6 inches from the bottom. When the instrument is to be used

the lower part of it, to near the grating, is filled with water, and the objects to be sterilised are placed in a tin vessel with a perforated bottom, which is introduced into the upper compartment, so as to rest on the grating. A large gas flame from a Bunsen burner is now allowed to play upon the bottom of the vessel, and when the water enters into ebullition the upper part of the cylinder becomes filled with steam.

The chief disadvantage of Koch's steriliser is that, in order to avoid the risk of the whole of the water becoming vaporised, a considerable quantity—two pints or more—must be introduced, and the time required to generate steam temperature throughout the upper part of the vessel is therefore prolonged. It follows also that a considerable gas flame is required to keep the water boiling.

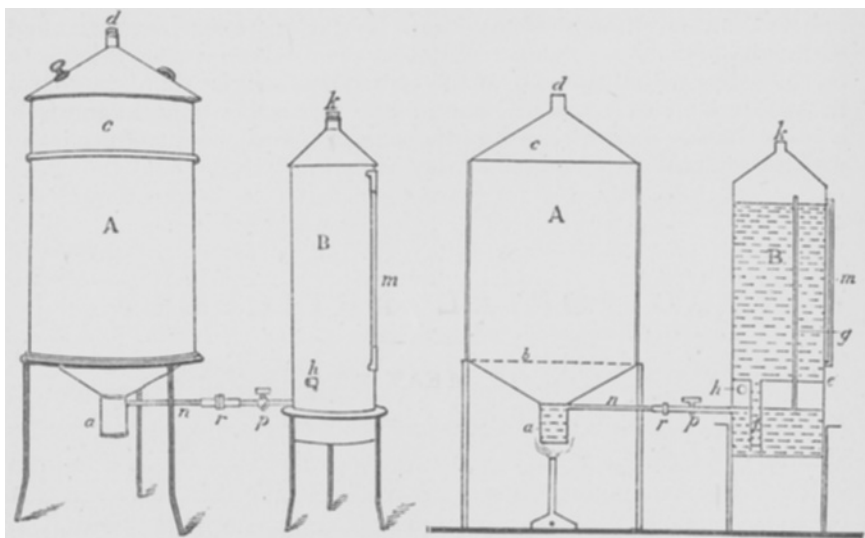
The steriliser which is here figured (p. 158) is one which has been in use by me in the Pathological Laboratory at the Veterinary College for the past four years. The credit of having suggested the improvement upon Koch's instrument belongs to my colleague, Dr A. P. Aitken. The modification consists in adding to the steriliser a second vessel, which acts as a reservoir, and automatically feeds the lower part of the sterilising vessel with a sufficiency of water. It is, in fact, an adaptation of the principle of the Bunsen evaporating bath.

The steriliser proper (A) is a cylindrical tin vessel with a conical bottom. To the apex of this cone there is soldered a small copper vessel (*a*) of the shape of a thimble. A piece of metal tubing (*n*) connects the interior of this thimble to the reservoir. As in Koch's instrument, a metal grating (*b*) is carried across the lower part of the steriliser, and upon this the vessel containing the objects to be sterilised rests. The lid of the steriliser (*c*) has a length nearly equal to that of the latter itself. The lid thus slides up and down inside the steriliser like a telescope tube, and by this simple device the capacity of the steam chamber can be varied at will. This is a great advantage, as, for example, when one wishes to introduce both a large flask and a filtering funnel, in filtering agar-agar or gelatine solutions. The centre of the lid carries an aperture (*d*) for a thermometer. Finally, the whole vessel may be provided with an envelope of hair-felt.

The reservoir (B) is a cylindrical vessel divided into two by a septum (*e*). The lower and smaller chamber communicates with the copper thimble of the steriliser by the previously mentioned metal tube. This tube is provided with a stop-cock (*p*), and for convenience it ought also to have a coupling (*r*), by means of which the two vessels can, if required, be disconnected. The lower chamber carries, just below the level of the septum, a cork hole (*h*). The upper chamber communicates with the exterior by a hole (*k*) in the centre of its roof, this hole being tightly corked when the instrument is in use. It also communicates with the lower chamber by two tubes; one of these (*f*) starts at the septum and leads down to near the bottom of the lower chamber. The other (*g*), which must be of narrow bore, passes through the septum, and is carried upwards to near the top of the upper chamber, and downwards into the lower chamber, where it terminates at the level of the metal tube connecting the reservoir with the steriliser. The upper chamber is provided with a water-gauge (*m*).

When the instrument is in use, the lower chamber contains water to the level of the tube connecting it with the copper thimble, and this latter

(the stopcock being open) is necessarily filled with water to the same level. The upper part of the lower chamber contains air, and communicates freely with the exterior by the hole (*h*), which is left open. The upper chamber contains more or less water, as does also the



STEAM STERILISER, OUTSIDE VIEW.

STEAM STERILISER, SECTION.

tube (*f*). The longer tube (*g*) contains air, and its lower end just reaches the surface of the water in the lower chamber, while its upper opens into an air-containing space above the water in the upper chamber.

As the water in the copper thimble is vaporised, its surface necessarily sinks, and since the water here is continuous with that in the lower chamber of the reservoir (through the connecting tube), the surface of the water in the latter also sinks. But, when this occurs, the lower end of the tube *g* ceases to dip into the water, and a bubble or two of air enters it, and passes up into the upper part of the upper chamber, the water of which is thus allowed to sink into the lower chamber by the tube *f*. But this immediately raises the level of the water in the lower chamber, and the lower end of the tube *g* being again submerged, the passage of air through it is cut off, and the further sinking of the water in the upper chamber is prevented. As soon as further evaporation of the water in the copper thimble has again lowered the surface of the water in the lower part of the reservoir, the same events are repeated, and so on, as long as any water is left in the upper chamber. When it is seen that the water in the latter is low, a new supply must be introduced. To do this the stop-cock in the connecting tube between the steriliser and the reservoir must first be closed, and the hole in the lower chamber must be tightly corked. The cork is then removed from the hole in the roof of the reservoir, and water is poured in here until it is seen by the water gauge that the upper chamber is nearly full. The hole in the top of the reservoir is now corked, and the stop-cock and the hole in the lower chamber are re-opened.

It is unnecessary to give details regarding the size of the instrument, as that may be varied according to requirements. It must be noted, however, that, to retain the advantages of the instrument, the copper thimble should always be small. In my own steriliser it has a length of 3 inches and a diameter of an inch and a half.

I find that, even without any hair-felt envelope to the steriliser, and with only a small gas-flame playing on the bottom of the thimble, a thermometer with the bulb at the centre of the steriliser registers a temperature of over 211° F. within ten minutes. With a reservoir holding half a gallon of water, the steriliser will work continuously without replenishing for a whole day.

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## EDITORIAL ARTICLES.

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### INSPECTION OF MEAT AT LIVERPOOL.

ABOUT twelve months ago great discredit was thrown upon the system of meat inspection in force in Glasgow by certain facts brought to light in the well-known tuberculous meat trial. It was then disclosed that the duty of practical meat inspection in that large city devolved upon policemen, and that, until a short time before the trial mentioned, cases of disputed seizure of carcasses had been adjudicated upon by a board of experts composed of two butchers and the police surgeon. This system, it was stated in evidence, had given every satisfaction to the Glasgow butchers, and no one will doubt that it deserved to.

It was generally supposed that this disgraceful state of affairs was unique, at least in the case of our large cities, and no one having any knowledge of human or animal diseases raised a voice in support of it. It appears, however, that an almost identical system of meat inspection is at the present moment in force in Liverpool, and, what is much more remarkable, one of the medical officers for the city has had the courage, not to say the hardihood, to defend it.

On a recent occasion, Professor Walley read at a meeting of the Lancashire Veterinary Medical Association the paper on meat inspection which appears in the preceding pages of this number. The Professor's strictures appear to have been construed by the Liverpool people, or by some of them at least, as having been specially directed towards the system of meat inspection practised in that city, and one of the medical officers to the corporation, through the medium of an interview with a newspaper reporter, has sought to rebut the statements made in the paper in question, so far as they might have been intended to apply to Liverpool. Dr Hope, the gentleman referred to, is described as deputy medical officer and chief of the sanitary department of the Liverpool Corporation. He is also, in passing, said to be "a recognised authority upon all matters relating to diseases of