nodule, there may be observed adhering to the posterior or under-surface of this numerous transverse fibres, which evidently have been torn from the floor of the bladder immediately adjacent to the vesical outlet. When these fibres are traced downwards they are found to pass into the circular layers of the capsule, and some of them split off and pass round each side of the intravesical nodule into the wall of the urethra.

In many specimens the capsule and the anterior commissure have given way, and allowed the two lobes to separate anteriorly. These open prostates form the great majority of the specimens. In 59 enucleated prostates 51 were open anteriorly, and only 8 closed. In three of the specimens a prominent adenomatous nodule was found in the middle line posteriorly. The ejaculatory ducts were torn across just above the nodule, which therefore represented an enlargement of the portion of prostatic tissue in the middle line immediately below these ducts.

It was evident in a few specimens that portions of the capsule on the surface of the lobes were wanting; the adenomatous nodules of the prostate are exposed at these parts, and it is not unlikely that a small nodule may have been torn off at the time of the operation and left behind.

An examination of the condition of the urethra in these specimens of enucleated prostate and the *post-mortem* specimens already described showed that in certain cases the entire prostatic urethra was removed. The prostates in which this occurs are nearly all of the closed variety. In a few the whole prostate urethra was left behind, and in these cases the prostate after removal was almost invariably of the open variety. In such cases a portion at least of the tube would probably slough. In some cases the part of the urethra between the bladder and the veru montanum was removed, and the part between the veru montanum and the membranous urethra was left behind. It seems probable, from the large proportion of these latter specimens, that this is what usually happens.

V.—OBSERVATIONS UPON THE OPERATION OF PROSTATECTOMY.

It is now possible to discuss the anatomy of the operation of prostatectomy. Is this operation a complete removal of the "entire prostate within its capsule," or is it merely a shelling out of adenomatous nodules from within the prostate itself as some would have it? Much confusion has arisen in discussing this question owing to the indefinite use of terms denoting the true capsule of the prostate and the envelope provided by the pelvic fascia. This has in the main, I believe, resulted from a want of clearness in the descriptions of our anatomical textbooks. Both those layers have been described without distinction under the term "capsule," although they are structurally distinct.

Sir Henry Thompson many years ago supplied a term which amply fulfils all requirements, and distinguishes the envelope of pelvic fascia as the "sheath" from the outer margin of stroma which is the "capsule," and corresponds to the capsule of other glands. Definition of these terms has become necessary, for it has been sufficiently evident that by some at least their meaning has not been thoroughly grasped.

When the evidence of completeness or incompleteness of the operation is considered, it is found that a small nodule was described adhering to the wall of the sheath after removal of the prostate. Further, it was noted that in the microscopic section the capsule was torn open at one part, and a nodule of prostatic tissue exposed, and on examining the total number of enucleated prostates the appearance of one or two of them would lead one to expect that some part of the capsule or a shred of prostatic tissue had been left behind. It is therefore apparent that in a few cases portions of the enlarged prostate have been left behind. Is it to be inferred from this that this operation of prostatectomy is an incomplete one? I think not. It is evident that in the vast majority of these specimens there is no question of nodules of prostatic tissue being left behind, and further, in two of the *post-mortem* specimens no prostatic conditions could be found. The accidental tearing away of such a nodule as was found in one *post-mortem* specimen from the main mass during the operation does not, in my opinion, affect the general question as to whether this operation is a total or a partial prostatectomy.

The question which really arises for discussion is not whether a shred of prostatic tissue is left behind in two or three of over seventy operations, but whether the line of cleavage of the operation passes between the prostatic cap-

sule and its sheath, or whether it passes along some plane within the capsule, or even within the gland.

The material I have brought forward and discussed in detail shows that the mass of tissue removed at the operation represents the whole of the enlarged prostate, whether it is in the form of two entirely extravascular lobes, or whether there is in addition a small or large intravesical portion; that this mass is surrounded by the thickened prostatic capsule, and in a few specimens portions of the bladder muscle are also removed. Further, that the parts left behind consist of the prostatic sheath, between the layers of which lie the prostatic plexus of veins.

The plane followed by the enucleating finger is therefore as follows: After scraping through the mucous membrane covering an intravesical projection, the finger meets the capsule of the prostate and passes along outside this, stripping the mucous membrane from off it. Keeping always to the capsule, the finger now passes through the lumen of the vesical sphincter, and is guided by these structures between the prostatic sheath and the prostatic capsule.

The finger can now be swept round each lobe, and the following structures must be torn through before the prostatic mass lies free in its sheath: The ejaculatory ducts, the vessels which pass out from the upper part of the postero-lateral horns, the vertical band of the muscle of Henle, and the urethra. Variations in the treatment of the urethra have already been described in detail. The strength of the anterior commissure, and to a less extent of the urethral wall, determine the fate of that tube, and the desire of the surgeon to leave it intact must be subservient to these factors.

If no intravesical portion be present, the finger must tear through the muscle of the bladder base before reaching the prostate, but this manœuvre is rendered easier than in the normal condition by the increased bulk of the prostate, over which the muscle fibres are stretched.

It is not to be supposed that in every case this operation is absolutely faultless. I have already shown that in a few cases a shred of prostatic tissue is left behind. But I submit that the operation represented by these specimens is a complete prostatectomy, and that small portions of prostate left behind are accidents of the operation, and not proofs of its incompleteness.

NOTE.

¹ This muscle was originally described by Henle (*Handbuch d. Eingeweidelehre*, 1866).

CHLORIDE OF ETHYL AND A METHOD OF ADMINISTERING IT.

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THE latest addition to the list of general anaesthetics seems likely to keep its place. Chloride of ethyl is pleasant in action, does not cause cyanosis, is taken readily by children as well as adults; its effects pass off almost with the rapidity of their induction; as it has few or no after-effects there is no preliminary preparation of the patients as in the case of chloroform and ether; it may be given with the patient sat up; as a preliminary to other anaesthetics it shortens the tedious interval which sometimes elapses before the patient is ready for operation; and, most important of all, it is, within the limits for which it is indicated, probably safer than any other anaesthetic, with the exception of nitrous oxide.

Chloride of ethyl has the advantage of giving an anaesthesia lasting twice as long as that obtained with nitrous oxide, whilst the deep anaesthesia is followed by a degree of analgesia sufficient to allow the painless completion of a short operation. In one of my own cases 8 c.cm. of the drug sufficed for the removal of a lipoma. Although a 5-in. incision, requiring six sutures, was made, and two vessels had to be tied, the patient had no recollection of the operation, and when she came round asked when I was going to begin.

The rapid and complete recovery with little or no vomiting, which, even if it does not pass into dangerous excess, is always unpleasant, and often a great tax upon nurses and attendants, should prove as great an economy of time and labour in hospital as it will be helpful in private work. One defect of the drug must be borne in mind. It does not always overcome muscular resistance. Within a short period I had two cases of displacement of one of the semilunar cartilages of the knee. But whereas in the first case—that of a working man who

came to the hospital—ethyl chloride was used with success in order to manipulate the limb, in the second case—that of a maiden lady of good physique, over 50 years of age—it was necessary to supplement the ethyl chloride with a few drops of chloroform before muscular relaxation was secured. It will be well, therefore, until further experience teaches us how to eliminate this uncertainty, to be prepared with a general anaesthetic when ethyl chloride is administered for conditions requiring muscular relaxation.

The method of administering the drug, if the contrivance I describe is used, is both simple and efficient. This consists essentially of a tube one end of which fits either the face-piece or other chamber of Clover's ether inhaler; the other end fits the bag. A fragment of lint sufficient to line the tube for three parts of its circumference, and cling closely to the side in tubular form so as to leave a clear air-way, is placed in the tube. In the tube is a hole which can be opened and closed at will by a revolving collar. This hole serves four useful purposes. Through it the anaesthetic is sprayed into the apparatus; by keeping the hole open for the first few inspirations until the patient is accustomed to the anaesthetic, the unpleasant taste and choking sometimes experienced when a strong dose is suddenly given are obviated; it provides a supply of air at any time during the administration, should the inflation of the bag be ineffective; while it is a valuable adjunct during ether administration following chloride of ethyl. A diaphragm of gauze at the bottom of the tube prevents the lint being sucked into the patient's mouth.

The accompanying illustration shows the tube interposed between the bag and face-piece of Clover's inhaler. This constitutes a complete chloride of ethyl inhaler. The tube is far from the mouth of the patient, if freezing takes place. In my own hands, during the last few months, as well as in the hands of two of my colleagues in the town and of the house-surgeons at our infirmary, the appliance has been used with every success.

If it is desired to follow the chloride of ethyl with ether, the chamber of Clover's inhaler is charged with ether in the usual way, and the tube interposed

between it and the bag. As soon as the patient begins to breathe the chloride of ethyl, the ether should be gradually turned on, so that the mixed vapours are inhaled.

As the illustration shows, the tube makes but a slight addition to Clover's inhaler. The tube remains in position throughout the inhalation, and adds a distinctly advantageous feature to Clover's inhaler. As soon as ether narcosis is established, the hole in the tube is opened. Then with each respiration, whilst part of the air goes to and from the bag, another portion passes in and out of the hole in the tube. Hence the patient breathes a much purer air than the carbonized mixture in the closed bag. I have used the ordinary rubber bag supplied with Clover's apparatus without drawback, but at Mr. Down's suggestion I have used one made of the material called Mosevig Batiste. This is better still, it is much lighter than rubber, is unaffected by the vapour, it can be reversed, as well as sterilized by boiling.

With this device I have experienced none of the disadvantages of the ethyl-ether sequence when ethyl chloride is placed in the Clover's ether chamber, as described in the *BRITISH MEDICAL JOURNAL* of April 23rd by Mr. Bampfylde Daniell, whose article I did not see until my method had been

in successful use some time. With this tube in the box of his Clover's inhaler, the anaesthetist has not only a complete chloride of ethyl inhaler, but a simple and efficient ethyl-ether inhaler. It should be possible with increased experience to secure an anaesthesia without any break between the ethyl chloride and the ether narcosis. In one of my cases this was effected in ninety seconds. With chloroform, in my experience, there has always been a recovery between the chloride of ethyl and the chloroform narcosis, whilst the after-vomiting and distress have been greater and more prolonged than when ether followed the ethyl chloride. In a case of Tredenburg's operation for varicose veins, although the house-surgeon found it necessary to follow the ethyl chloride by ether, the patient on getting back to the ward showed little sign that she had had an anaesthetic, and had a good tea with the rest of the patients about two hours later.

With the apparatus I describe the mixture of A.C.E. or of ether and chloroform can be substituted for ether, and with the hole in the tube open the bag may be kept in position. I have only to add that my thanks are due to the makers of the tube, Messrs. Down Brothers, for suggestions in the details of the apparatus, after I had proved in practice with a home-made model its feasibility and success.

A MODIFICATION OF HAMMOND'S SPLINT FOR THE TREATMENT OF CERTAIN FRACTURES OF THE MANDIBLE.¹

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THERE are so many splints and modifications of splints in use for the treatment of fracture of the mandible, that I almost hesitate to bring forward another.

The splint that I intend to bring under your notice is a modification of Hammond's splint, which I have found very useful in two cases, the notes in which I will read to you presently.

Hammond made his splint of iron wire, but iron wire is far too soft, and it does not solder very easily, and its taste is rather against it. I have used dental alloy, which is an alloy of platinum and silver, to make this splint. Hammond's splint, as you know, consists of a stout wire which is bent right round the arch of the teeth inside and outside, fitting closely the necks of the teeth, and the two ends of the wire soldered together. This is placed over the teeth and held in position by binding wires passed between the necks of the teeth at various points.

In my opinion there are various objections to Hammond's splint. In the first place it takes a considerable time to make, and it is a most annoying thing to make, for the reason that as you bend it at one place to get it close to the neck of a tooth, it is very apt to be bent out of position at another place.

Another objection is that it is difficult to apply. A patient suffering from fracture of the mandible is not as a rule able to open the mouth very widely. This makes the application of the furthest back ligatures, say, round the first molars on either side, difficult, and the manipulation necessary for their application causes the patient a considerable amount of pain.

Fig. 1.

Another great objection is that unless the furthest back teeth on either side are well erupted so that the wire can fit down snugly behind them, when the patient closes his mouth,

¹ Read before the Aberdeen Branch of the British Medical Association.