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.

he bites on the splint at the back, and so tends to drag it up in front.

These objections to Hammond's splint are well exemplified in this case. This was a case in Dr. Booth's ward. (Fig. 1).

The patient was a boy, aged 14, who had his mandible fractured by a kick from a horse. It was some days after the accident before he came into hospital, and there was great swelling of the face, and the boy could only open his mouth a very little way, and the parts were extremely tender when handled. The fracture was between the right lateral and canine.

The impressions were taken with difficulty, and as the teeth were sound and steady, a Hammond splint seemed to be suitable.

As you can see from the model, the second lower molars are not fully erupted, so that the splint when made lies over their crowns. Owing to the patient's inability to open the mouth very widely, there was great difficulty in applying this splint, and its application gave great pain to the patient, and when it was applied and the mouth closed, the upper molars came down on the back of the splint and gradually dragged the front of the splint up, and although we ultimately got a good result, it was at the expense of a great deal of trouble and worry and pain to the patient, because every few days we had to religate the splint in position.

In order to overcome these difficulties I have modified Hammond's splint, the modification being applicable to all cases of fracture occurring towards the front of the mandible, and the majority of cases of fracture of the mandible which are suitable for treatment by Hammond's splint occur towards the front.

The cases that are suitable for treatment by Hammond's splint of course are those where the teeth are comparatively sound and steady and there is more than one tooth on either side of the fracture or fractures. The splint consists of a stout flattened wire of dental alloy fitted round the arch of the teeth in front, and another similar wire fitted round the arch of the teeth behind. Collars of No. 4 or No. 5 thickness of dental alloy plate are then fitted three-quarters round the back and sides of the second bicuspid or other suitable teeth on either side, and the ends of the wires soldered on to these collars with gold solder. The fracture having been reduced, the splint is placed in position and held in place by ligatures of binding wire passed between the necks of the teeth at suitable points. If the teeth are very close together it is necessary to use a dividing file in order to allow the collars to slip on easily. This splint can be made very quickly and very easily, in less than a quarter of the time it takes to make a Hammond. The easiest and quickest way to make the wires is to hammer them up between a zinc cast and counter. It is very easy to apply, and the patient experiences little or no pain during its application, and when applied, it holds the fragments very firmly in position and has no tendency to slip.

I have only had the opportunity of using it in two cases as yet, but the results have been all that could be desired.

I will now read you the notes on the two cases:—

CASE I.—D. R., aged 17. Paper Worker. Compound Fracture of the Mandible.

The family and previous history have no bearing on the case.

History of the Accident.—On February 19th, 1902, patient was pushing a hand-cart with a load of paper on it, when one of the wheels stuck in a hole in the floor. He gave the cart a sudden push to get it out of the hole, with the result that the load rolled off, the front of the cart came down, and patient fell forwards, striking the left side of his lower jaw, just below the chin, on a horizontal iron bar that ran across the back of the cart. He felt a sharp pain at the time, but this soon passed off, leaving a dull ache in the part. There was no shooting pain. There was a good deal of haemorrhage, the oozing continuing for about twelve hours. He went home and tried to take dinner, but found he could not eat on account of the fragments of his lower jaw moving about. There was very little swelling of the face and no dribbling of saliva. He came into hospital next day and was admitted to Dr. Riddell's ward.

Dr. Riddell asked me to see the case, and I saw the case on February 24th.

Physical Examination.—Patient is an under-sized slightly-built youth. There is a small skin wound below the chin not

connected with the fracture. He can open his mouth fairly well, but doing so causes pain. On looking into the mouth, a wound is seen running between the left lower lateral incisor and canine, and extending to the lip furrow in front and to the floor of the mouth behind. It runs obliquely downwards and inwards, and the mandible is fractured in the line of the wound, the alveoli of both the canine and the lateral incisor being involved in the fracture, but both teeth are quite steady and not periostitic. The smaller fragment is displaced slightly outwards and forwards, and it is about a quarter of an inch higher than the larger fragment. This is not very evident on the model on account of the jaw being held up into the impression material. The fragments are freely movable and crepitus is easily made out. The fracture is easy of reduction, but the fragments do not stay in place. There is no loss of sensation and no dribbling of saliva. The teeth are fairly good with the exception of the first left lower molar which is very much decayed and painful.

Treatment.—Impressions of both upper and lower jaw were taken fairly easily, cast, the lower sawn through at the line of fracture, and articulated to the upper in the usual way, and then a splint of the kind I have described made, with the collars round the back of the first lower bicuspid on the right side and the second lower bicuspid on the left (Fig. 2).

Fig. 2.

Next day (February 25th) the carious first left lower molar was extracted, the fracture reduced, and the splint applied. Fortunately there was a space behind the right first lower bicuspid so that the collars slipped on easily. Ligatures of binding wire were then passed between the necks of the teeth round the first left bicuspid and the right lateral incisor. A boric dressing was placed over the wound below the chin and held in place by a bandage. The patient was told to keep his mouth shut and speak as little as possible for a few days. He was ordered liquid diet, the mouth to be frequently irrigated with warm boric lotion.

The splint kept the fracture in excellent position.

On March 2nd I removed the splint, because I thought it looked rather dirty, cleaned it, and replaced it as before. The wound below the chin had healed.

On 7th March the wound of the mucous membrane had healed and there was good fibrous union of the fracture. The patient was put on soft food.

On March 14th he was put on ordinary food, but told to avoid hard and tough substances for a little time.

On March 16th he was sent out to the convalescent hospital for a week, the jaw being apparently quite firm, but the splint was not removed in case of accident.

He returned on March 27th, and had the splint removed, the fracture being quite firm and the articulation perfect (Fig. 3).

Fig. 3.

CASE II.—G. D., aged 35, General Dealer. Compound Fracture of the Mandible.

The family and previous history have no bearing on the case. *History of the Accident.*—On March 22nd G. D. was standing

on the golf links behind a man about to hit a golf ball. The up-swing of the club hit him below the chin slightly to the left side. He felt a sharp pain at the time which soon passed away. There was slight bleeding into the mouth, and he felt his lower front teeth had been loosened.

He did not think much about it, and, being interested, followed the players round the links and saw the finish of the match. He then went to his lodging to tea, but found that he could not eat anything on account of the fragments of the lower jaw moving about, and he had great difficulty and pain on attempting to swallow fluid. By this time there was considerable swelling of the lower part of the face, especially on the left side, and owing to the difficulty in swallowing saliva dribbled from his mouth.

He went to the infirmary next day, where a house-surgeon told him his jaw was broken, and bound the teeth on either side of the fracture (the lower centrals) together with binding wire, gave him a piece of cork to bite on, and ordered him a mouth-wash of Condy's fluid.

He attended the infirmary for a week as an out-patient, during which time the swelling of the face subsided, and he was again able to swallow without pain, so that the dribbling of saliva stopped.

He then went home to Aberdeen, and came up to the hospital as an out-patient to Dr. Gray. Dr. Gray removed the wire, which was loose, and the left central which was necrosed, and dispensed with the cork. He put the jaw up in a four-tailed bandage, and told the patient to come up again and see him. The patient did not come up again for ten days, when Dr. Gray turned the case over to me.

I saw the case on April 10th.

Physical Examination.—The patient is a strongly-built, healthy-looking man. On examining the mouth, which can be fairly well opened, a wound is seen running vertically downwards between the right lower central incisor and the socket of the left, extending down to the lip sulcus in front and to the floor of the mouth behind. The mandible is fractured in the line of the wound. The socket of the left central is opened into by the fracture. The right central is steady and not periostitic. The wound is suppurating freely. There is slight displacement about an eighth of an inch downwards and outwards of the right fragment and the patient cannot close his mouth properly. Movement of the two fragments is free and crepitus can easily be made out. The fracture can easily be reduced but does not stay in place. There is no pain except slight pain on moving the fragments. There is no loss of sensation and no dribbling of saliva. The teeth are sound, strong, and very close set.

Impressions were taken without difficulty, cast, and the lower sawn through at the line of fracture and articulated to the upper in the usual way, and a modified Hammond's splint made in the way I have described, the collars going round the backs of the second lower bicuspid (Fig. 4).

Fig. 4.

Next day (April 11th) the fracture was reduced and the splint applied. Owing to the closeness of the teeth a dividing file had to be used to allow the collars to be applied. Ligatures of binding wire were put on round the first bicuspid on either side and the right lateral incisor. A bandage was put on to aid the patient in keeping his mouth shut. He was told to keep his mouth shut and speak as little as possible for a few days, to take liquid food and come up daily to have his mouth irrigated.

At the same time he was given a boric mouth-wash.

The splint kept the fragments in excellent position, but owing to the free suppuration from the socket of the left central, healing was rather slow.

On April 24th a small sequestrum of bone was removed from the wound, and by that time there was fairly good fibrous union, and the patient was put on soft food.

On May 8th the splint was removed, the fracture being

quite healed and the articulation perfect (Fig. 5.) There was still some discharge from the socket of the left central. The patient was put on ordinary diet.

Fig. 5.

On May 12th another small sequestrum was removed and after this the discharge disappeared in a few days, and I last saw the patient on May 16th, when he told me he had a steak to dinner the day before, and ate it with comfort and relish.

MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

AIR IN THE HEART.

PERHAPS some reader may be able to suggest the source of the air in the right side of the heart in the following case: A woman, aged 60 years, was found dead in an open field on the bank of a little spring. The body was in the genu-pectoral position, and it is believed the woman died in the act of climbing up the bank after drinking water at the stream. She was seen alive within twenty-four hours of the necropsy, the result of which may be summed up as follows:

A well-nourished, rather stout, coloured woman. No external sign of violence or injury. Thorax: Right lung distinctly congested throughout, but no consolidation; left lung much paler and rather emphysematous. Old pleuritic band of adhesion to lower ribs on right side anteriorly. Pericardium bulging, especially over the right ventricle, and seemingly filled with the heart; nothing in pericardial sac. Heart rather fatty, and its muscle pale and brownish. Right side of heart distended with air or gas, which hissed out on incision being made, leaving nothing but dark frothy blood in right cavities. Left ventricle empty, except for small *post-mortem* clot; its wall moderately hypertrophied. Valves competent and healthy, except for calcareous deposits in aortic cusps. Nothing to be discovered abnormal in air passages or large vessels at root of the neck. Abdominal organs all healthy, except for kidneys, which were in a state of granular degeneration. The uterus and appendages were healthy. The brain and spinal cord were not examined.

It was difficult to make a satisfactory dissection in the open field a long way from home, and I found it impossible to trace the source of the air in the right heart, which I am quite satisfied was the cause of death. I shall be very glad of any suggestions that may assist in furnishing an explanation of this very rare condition.

Jamaica.

P. O. MALABRE, M.B., C.M.

CASE OF CRYPTOPHTHALMOS.

ON March 10th, 1904, a Mohammedan woman brought her daughter, aged 6 months, to the mission dispensary. The eyeballs were completely covered over with skin; over the right eyeball there was a horizontal scab $\frac{1}{4}$ in. long, the result of a *hakim's* interference. There were no eyelashes. The eyeballs were prominent and under the control of muscles.

Under chloroform a horizontal incision $\frac{1}{2}$ in. long was made over the left globe. The conjunctival sac was very imperfect, being fairly complete only in the direction of the lachrymal gland and in the internal and lower segment. The cornea was covered by a loosely-attached membrane. This was dissected off, but no pupil was to be seen. Four sutures were put in, joining skin and mucous membrane.

When the eye was dressed on the third day the cornea had assumed a ground-glass colour except at the upper margin, where there was a clear area the size of a pin's head, but the final result I am unable to state as the mother took the child away on the tenth day, and although pleased with the small