In the article previously mentioned I said, "Tubercles of the choroid are excessively protean in their characteristics, and one must be prepared to find them under several guises. From choroidal atrophy, their proximity to the optic disc, and the fact that they are slightly raised, taken together with their often isolated character, ought to be sufficient distinctions. To distinguish between choroidal and retinal pigmentary disturbance confined to the deeper layer is, of course, quite impossible; where they assume the appearance of localised patches of choroiditis, the absence of inflammatory symptoms in the eye, and their often close proximity to the optic disc, will serve to distinguish them; and the same may, perhaps, be said where the overlying retina is oedematous, and it is impossible to detect the underlying choroidal

J. W., aged 3 years. Right eye (indirect).

mischievous. At any rate, these appearances met with in a case of possible acute tuberculosis should be sufficiently diagnostic of the tuberculous condition. When the body appears like a grey tubercle, and more especially if this is noticed to be raised by a parallax or otherwise, it should not be possible to mistake the appearance for anything else. Though these bodies more often than not have a well-defined margin, yet, as has been seen, this is not always the case, and an indistinct and irregular margin should not be taken to contraindicate tubercle."

The views, then, that I expressed with regard to the ophthalmoscopic appearances of tubercles in the choroid, and their diagnostic distinctions from other fundal diseases presenting somewhat similar characteristics, are in no way prejudiced by this fresh narration of cases.

I should have, perhaps, added that a peripheral situation in the fundus, although of less frequent occurrence, does not contraindicate the diagnosis of tubercle.

THE ADMINISTRATION OF ETHER IN OPERATIONS REQUIRING THE LATERAL OR THE PRONE POSITION.

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On three occasions recently I was called upon to administer an anæsthetic in cases where, from the nature of the proposed operation, a completely prone position was requisite. The patients were healthy middle-aged subjects, and nothing presented itself either in their general condition or in the nature of the operation to contra-indicate the use of ether. This anæsthetic was accordingly administered, Clover's portable inhaler being used, and the patient lying at first in the usual supine position. As soon, however, as the prone position had been assumed, it was found that the further use of the ether inhaler was rendered well-nigh impossible by inaccessi-

bility of the face, and chloroform was substituted for the remainder of the administration. Now, although the behaviour of these patients under chloroform was in every way satisfactory, I am well aware that a certain amount of risk was incurred, and my object on the present occasion is to urge the preference to be given to ether under similar circumstances (that is, in cases where a completely or partially prone position is requisite, and where the general condition presents no contra-indication to its use), and to bring under notice a simple contrivance whereby the inconveniences thus attendant on its administration may be overcome.

That mechanical interference with thoracic expansion is in itself able to bring about a fatal asphyxia is sufficiently demonstrated by the numerous records of cases where suffocation is to be attributed to this cause alone. An essential difference must, however, be noted between the operation of such interference in the ordinary state of consciousness and in the passive condition of artificial anæsthesia respectively. In the former case the sensation of impending suffocation is recognised by the subject and increased muscular effort is put forth, sufficient or not, as the case may be, to counteract the effect of the opposing force; in the latter case there is no longer consciousness of the need for increased respiratory effort and, furthermore, the action of the anæsthetic in causing the progressive relaxation of most of the muscles therein concerned will ultimately render such increase of muscular exertion physiologically impossible. Dastre, in his work on anæsthetics,¹ gives the result of an experiment conducted on a dog weighing between 12 and 13 kilogrammes; before anæsthesia, a weight of 75 kilogrammes, applied to the sternum, was required in order to arrest respiratory movement; after insensibility had been produced by chloroform, 58 kilogrammes sufficed, whilst at the end of one hour a weight of only 25 kilogrammes (or one-third of the original weight) was required to bring about the same result. The experiments conducted at Hyderabad point to a similar conclusion; in two cases where the chest was enclosed in a plaster-of-paris jacket, and the abdominal movements were also restricted, the animals are reported to have succumbed very quickly.² As regards actual clinical experience, I have twice met with cases where under chloroform an absolute cessation of respiration occurred as the direct result of impeded thoracic and abdominal movement in the semi-prone position; this was at once rectified by simply replacing the patient in the supine position, and thus removing the mechanical impediment. Furthermore, several cases have occurred where a fatal result is to be attributed to a prolonged use of chloroform in the prone position, although unfortunately, as far as I am aware, they have not been reported.

A very brief consideration of the condition of things will, I think, render obvious the possible dangers which may be met with clinically. In the prone or ventral position the superincumbent weight of the trunk acts directly upon the most mobile portion of the chest walls, and must necessarily interfere materially with their free expansion, whilst at the same time the descent of the diaphragm is similarly hampered by compression of the abdominal walls. If now, on the one hand, the narcosis induced be a deep one, the chances are greatly in favour of this mechanical embarrassment so far interfering with respiratory action that both it and the circulation are in a short time seriously, if not irretrievably, compromised. If, on the other hand, the narcosis be a light one, it may well happen that in the new position the range of inspiration, and with it the intake of chloroform vapour, are so much interfered with that an actual retrogression of symptoms occurs; in this way a stage of narcosis which, although moderate in degree, is yet sufficient to guard against the occurrence of reflex respiratory obstruction, masseteric spasm and the like, may pass gradually into one of a lighter degree, in which these dangerous complications are most liable to supervene. Such conditions occurring in the course of a shallow breathing may be readily overlooked by any but the most experienced and vigilant administrator, and in the particular position which I am now considering, where the openings of the mouth and nose, the pupils, the eyeballs, and the face generally are more or less concealed from observation, there will be a great liability to fall into error as regards the

¹ A. Dastre, *Les Anesthésiques*, Paris, 1890, p. 92.

² Lauder Brunton, *Med. Soc. Trans.*, vol. xiii, 1890, p. 271.

actual stage of narcosis present at any given moment. In this way, the one great safeguard of chloroform administration—namely, the maintenance of a precise and uniform level of narcosis, accurately adapted to the exigencies of each particular case—will be rendered difficult, if not impossible.

It will be seen from a consideration of these points how important it becomes, if we are to work, so to speak, in the dark, that we should above all things secure a strong, deep, and easily audible respiration, for under these conditions we are at once alive to any impediment to the freedom of respiration however produced, and are able without delay to take steps for its correction. Such conditions may be counted upon with almost absolute certainty when ether is the anæsthetic employed, and although the character of respiration during the administration of chloroform no doubt in many instances fulfils these requirements, yet even in normal subjects placed in favourable positions we often find that, from some cause or another, the respiration will sink down to a quiet, almost inaudible, condition. It is then that mechanical obstructions become sources of the greatest danger—first, because they are practically inaudible, the difference between a very shallow breathing and no breathing at all being almost inappreciable to the sense of hearing; and, secondly, because, the actual force of respiration being already at the lowest level compatible with efficiency, any mechanical impediment, however slight, will be liable to cause a complete obstruction—an obstruction which a stronger and deeper respiration would have easily overcome. It is scarcely necessary to point out that an oversight of this nature is, in the case of chloroform, much more liable to be followed by a speedy compromise of the circulation and general vitality of the patient than in the case of ether, where the time at our disposal to recognise and correct faulty conditions is a comparatively long one.

I consider it a point of great importance that, in operations conducted in the prone position, ether should be used in preference to chloroform, always supposing that the nature of the operation or the condition of the patient as regards age, lung conditions, etc., offers no contra-indication. The difficulties attending the administration of ether under these circumstances are simply mechanical, and as such are to be easily overcome. The use of Clover's portable inhaler being so general, it seemed to me advisable to render this adaptable to altered positions. After experimenting with various intermediary tubes and modifications of the face piece, I have finally adopted a contrivance which appears to be at once simple and efficient. This is represented in Fig. 1, and con-

Fig. 1.—Angle tube (natural size) showing the inhaler and face piece in dotted outline.

sists of a tube bent on itself to a right angle, the projecting portion of the angle being somewhat rounded off. At one end the tube fits on to the keyway of the inhaler, and is notched

in its circumference in order to receive the index arm; at the other it is made somewhat conical, so as to fit into the metal mount of the face piece. By the interposition of this tube the axis of the ether chamber is brought to a right angle with that of the face piece; this is clearly shown in the diagram, where the original portions of the inhaler are represented in dotted outline.³ The actual position of the apparatus when in use will be readily appreciated by reference to Fig. 2. The

Fig. 2.—Drawing from a photograph, showing the use of the angle tube in the prone position.

patient is here shown lying in the prone position, the face being more or less buried in the pillow. If now there is provision for the admission of fresh air to the interior of the inhaler (preferably by the use of a two-way cock as shown in Fig. 2), the administrator will require to exert little, if any, interference beyond the regulation of the amount of ether supplied, and an occasional removal of the apparatus for the purposes of refilling it, or for clearing the face piece. I have used it during the last few months in three cases of operation in the prone position, and have fully appreciated the contrast between the physical fatigue and inconvenience involved hitherto, and the repose both to patient and administrator obtained by its use.

It is well, in cases where the position during operation is to be prone or semi-prone, to commence the administration in the supine position, leaving the patient himself to place his head in the position which is most comfortable. As soon, however, as the perceptions are somewhat blunted, the head should be turned over to one side or the other, preferably to that which it will assume during the operation. This turning over of the head is undoubtedly a detail of some importance, for it is just about this period that mucus and saliva begin to be produced in large quantity, and, if allowed to pass to the back of the pharynx, will certainly be swallowed. The irritating nature of this mucus is well known, and its free entrance to the stomach during a partial anæsthesia is often the cause of a troublesome after-sickness. The necessary stage of narcosis having been arrived at and maintained for a few minutes, the patient may now be turned over into the position required for the operation, and it is at this time that the inhaler should be removed for five or six respirations in order to fit on the angle tube, care being taken that the face piece is put on in such a way that it corresponds to the direction in which the patient is lying. As regards the actual amount of ether vapour supplied, I have not noticed that the addition of this tube makes any difference whatever.

Operations conducted in the lateral position naturally present themselves with much greater frequency than those to which I have referred at the commencement of this paper, and it is in these cases that the angle tube will find its widest application. I have now used it in some thirty operations of this description. With regard to actual embarrassment of respiration, clinical observation seems to justify a very marked distinction between the two extremes of the lateral position, which may be called respectively the latero-prone and the

³ The angle tube is made by Messrs. Mayer and Meltzer, of 71, Great Portland Street.

latero-supine. In the former the weight of the body falls on a point anterior to the axillary line, the lowermost arm lying behind the patient; in the latter it falls on a point posterior to this line and the arm lies in front. There is no doubt that a force which hampers chest movement by acting from without will do so with far greater effect if applied to a point anterior to the axillary line than if applied behind this point, and clinical facts certainly confirm this view. Nor is the mechanical embarrassment confined to the one side of the chest, as might at first sight be supposed; the superincumbent weight of the uppermost shoulder and arm is a factor not to be overlooked, and exercises a most important influence, especially in cases where the limb is bulky and heavy and the chest walls weak and yielding. Here also the distinction between the two positions is maintained; in the former the arm is thrown forward, its weight compresses and impedes the action of the chest walls on which it rests, whilst the falling forwards of the scapula contributes still further to the inefficiency of expansion; in the latter the uppermost arm falls backwards, its weight acts little if at all on the chest walls, and the scapula and its muscles are in the most favourable position for action.

In conclusion, I think that theoretical considerations, together with clinical experience, justify me in making the following statements:

1. The prone and the latero-prone positions interfere materially with chest expansion, and are hence liable to bring about a condition of partial asphyxia.

2. In these positions ether should be used in preference to chloroform if there is nothing in the nature of the operation or in the general condition of the patient to contra-indicate it.

3. If it is necessary to use chloroform, full narcosis should be induced in the supine position, and the patient then allowed to come back to a lighter stage, and kept there during the time that he is in the constrained position.

4. On the first warning of respiratory failure the patient should be moved at once into the supine position until breathing is again satisfactory; the operation may then be safely completed in the latero-supine position.

5. A possible retrogression of narcosis should always be borne in mind, and if the operation be one involving sensitive parts or otherwise liable to set up reflex spasm and mechanical respiratory obstruction it will be well, as a precautionary measure, to insert a small prop between the teeth, so that, if necessary, a gag may be introduced and the mouth widely opened without unnecessary delay.

6. In the latero-prone position the arm and shoulder which are uppermost should, as a rule, be supported throughout the entire operation.

7. In every case particular care should be taken that all constricting articles of clothing are loosened or removed.

MEMORANDA:

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

CHLOROFORM ADMINISTRATION.

I was lately requested by Mr. J. Stuart Nairne, in the name of the staff of the Samaritan Hospital for Women of this city, to demonstrate the safety of chloroform in the case of a patient who was believed to be dangerously susceptible to its toxic action. She was the subject of a large ovarian tumour, which it was proposed to remove, and she suffered from some pulmonary or bronchial affection causing cough and dyspnoea. A previous attempt to chloroform her, during which only 1 drachm of the anæsthetic had been used in a cautious manner, resulted in syncope within two minutes, and she was only resuscitated after about fifteen minutes of artificial respiration, while she suffered from severe and protracted vomiting afterwards.

The second attempt to chloroform this patient was made a few weeks after the first, and in the presence of the majority of the staff. It was the first time I had seen the patient, and she was certainly very cachectic, while her pulse was by no means strong. The process was conducted as follows:

The room had previously been raised to 65° F., and a towel thoroughly warmed and dried at the fire was employed for administering the chloroform. On this towel two measured drachms of the liquid were poured every minute for the first four minutes, and one drachm a minute for the next two, when the patient was thoroughly under. She was made to inhale the vapour without a single pause during these six minutes, and her countenance did not change throughout. There was a very mild excitement stage during the fifth minute. The operation was successfully performed by Mr. Nairne, and when I left, about ten minutes after its completion, nothing abnormal was observed about the patient, although she was still drowsy. It appeared that when she fully recovered consciousness there was some respiratory embarrassment, which got markedly worse at 1 A.M. next morning (thirteen hours after the operation), and of which she died at 5 A.M. She was sick for a few hours, but did not vomit. There was no *post-mortem* examination.

Cases which terminate fatally within twenty-four hours after such an operation as ovariectomy, and especially in cachectic subjects, are not so very uncommon, but whatever the cause of death in the above case it would appear that there was no syncope, either primary or secondary. The administration was conducted in accordance with what I regard as the first and most important rule in chloroform narcosis, namely, to keep a constant atmosphere of the vapour until deep anæsthesia is reached. This rule is founded on the view I have advanced as to the cause of primary syncope, namely, that it is due to the reaction which ensues in the circulation when the inhalation is stopped at a certain early stage. I may be allowed to express surprise that it should be objected that I have no evidence in support of this view. The fact that if we stop the inhalation at the end of a single minute in the cat the pulse will rise in about ten seconds to 200, and that this may be followed by a total cessation of cardiac action for a whole minute, and the further fact that this train of events will not ensue if the anæsthesia be made sufficiently deep in the first instance—these two facts are surely deserving of notice, and I believe they could be multiplied. It is surely significant that a rapid running pulse has been sometimes observed to precede syncope in the human subject.¹ Experiments on dogs seem to show that syncope may occur in them in the same way, and not only so, but that it may prove fatal. Further, it can be demonstrated that the same form of syncope may ensue and prove fatal in a mouse, and that it is accompanied by the same gasping respiration which is so often described in the human subject. It can hardly be denied that numerous fatal cases in the latter correspond exactly to what was to have been expected according to this view of the matter.

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"SCARIFICATION" IN DROPSY.

It often occurs in the course of practice that a case of dropsy presents itself in which, although the constitutional symptoms are greatly alleviated by appropriate medication and diet, the physical inconvenience resulting from the accumulation of a large quantity of fluid in the abdomen and other parts of the body is not proportionately relieved. In these cases the operation of paracentesis abdominis is the one that is usually resorted to.

Besides requiring a special apparatus in the shape of an aspirator (which, by the way, is very likely to be out of order when most wanted), or at the least a trocar and cannula, the operation of tapping is not without its risks. On the other hand, the simple, and to my mind the most effectual, method of dealing with such cases is by linear scarification, which is done thus: the abdomen having been first washed over with clean warm water and soap, and then sponged over with a weak solution of hydrarg. perchlor. (1 in 3,000), a number of perpendicular incisions just deep enough to draw blood are made with a perfectly clean scalpel, the end of which should be sterilised by dry heat immediately before use. These incisions should be made rapidly with a light and firm touch, and should not be less than a quarter of an inch apart, or

¹ Wilson, *Med. Chron.*, April, 1890; and Lyman.