Let *a b d c* be four heart-beats occurring during a complete respiration, consisting of inspiration, expiration, and pause. Then, on listening over the pulmonary apex, where slight consolidation is present, at beats *a d* and *c*, the heart-sounds will be heard distinctly as such, but at *b*, which is in the centre of the inspiratory-murmur, the cardiac-sound will be so masked by the breath-sound, that it will not be distinctly heard as such, but the breath-sound will, at that instant appear only as if it itself were abnormally loud; it will seem wavy or jerky.

If now, in the course of weeks or months, the consolidation becomes considerably greater, the pulmonary conductivity will, in proportion, become greater, and the heart-sound may be so well conveyed, that it will speak out quite distinctly through even the harshest inspiratory-sound, and so the breath-sound will no longer be described as being wavy, but it would be entered in a clinical record that the heart-sounds were abnormally well conducted.

If, during an inspiration, there were two cardiac contractions, then the breath-sounds would mean two augmentations (Fig. 2) at *b* and *c*; and thus the inspiratory sound, instead of appearing to be divided into three parts, as in Fig. 1, would appear as broken up into five parts (1, 2, 3, 4, 5 in Fig. 2), and this could not be better described than by the term cog-wheel respiration.

Fig. 2.

Thus the wavy inspiratory sound, due to the breath-sound being supplemented by the cardiac sounds, may be of a very varying character. As one effect of partial consolidation of the pulmonary tissue is to augment greatly the expiratory sound, we have it also, in like manner, liable to become wavy.

Whether or not wavy respiration is ever due to other causes than that I have advocated, I do not at present give a positive opinion; but certainly, in the great majority of cases, the mode of its production is that which I have just explained.

Dr. THEODORE WILLIAMS (London) said he quite agreed with what Dr. McVail had said; but if Dr. McVail would refer to a work on consumption by his (Dr. Williams's) father and himself, now out of print, in which almost exactly the same view was advanced, and he might have mentioned that the original idea of it was suggested by Dr. Theophilus Thompson.

ON THE USE OF ANÆSTHETICS DURING LABOUR.*

By THOMAS D. SAVILL, M.D.Lond.

IN opening this discussion, I will ask your kind attention to three questions:—

1. What are the advantages and disadvantages of the use of anæsthetics during normal labour?

2. What are their advantages and disadvantages during abnormal labour?

3. What is the best kind of anæsthetic to use, and the best mode of administration?

1. In normal labour. Many years ago this subject had a moral aspect, and I am told that the question still exists in the minds of the laity, but we need scarcely stop to discuss it now. The pains of even healthy labour are in some cases very severe, producing at times what almost amounts to delirium. Are we not then justified in giving some form of anodyne, just as we would for a neuralgia? Provided we avoid certain risks, why should we not assuage the pain in the one as well as in the other? In these days of scientific medicine, when we are so far in possession of the knowledge of the conditions and sources of danger, we can with greater boldness employ agents for the relief of suffering which, in darker times, we rightly hesitated to use even for the neces-

sary treatment of disease. Moreover, pain is a depressing agent in itself, and lowers the vitality of the sufferer; and we ought, on this account, to relieve it where possible. Of course, it behoves us first to become acquainted with the risks we run, and to see that they are reduced to a minimum. But the relief of pain is not the only advantage which anæsthetics have in normal labour, for they also obviate a tendency to certain complications. Rigidity of the cervix, and other irregular uterine contractions, depending on functional causes, are less likely to occur when chloroform has been given, even to a slight extent; and the indirect good thus done is equivalent to all the advantages of a speedy over a tardy labour. Again, in some women there is an inherent predisposition to puerperal convulsions, so justly dreaded by the obstetrician; and this tendency anæsthetics will counteract by quieting the nervous system, and abolishing the pain which acts as an exciting cause.

It is right, however, that we should bear in mind the objections that there are. The first, and indeed the only formidable one, is the tendency to produce *post partum* hæmorrhage. It is now well established that both ether and chloroform, when given to the full extent, produce great relaxation of the muscular tissues throughout the body—voluntary and involuntary. About the voluntary, anyone can assure himself; and that the organic muscles also share in the general relaxation, is evidenced by the diminished vermicular movements of the intestines of an animal after death; by the dilatation of the pupil which occurs after the initial stage of administration; and by the diminution, and sometimes abolition, of the uterine contractions, which occur when the full effect of either of these drugs is induced. It is in this way that they hinder nature's method of closing the uterine sinuses after the separation of the placenta, and then flooding occurs. How to obviate this untoward result should be one of our chief aims, when an anæsthetic has been used.

By interfering with the uterine contractions* before expulsion of the foetus, labour becomes somewhat prolonged. And, further, all anæsthetics (but especially ether) are apt to be attended with troublesome vomiting, and followed by headache and depression.

You will notice that all these evils arise from complete anæsthesia. Partial anæsthesia is not attended by them, if other conditions be favourable; and I believe it is this fact which will explain the discrepancy between some of the statements as to the effect of anæsthetics on the uterine contractions.

2. Let us turn now to the case of abnormal labour. By that, I mean labour that is complicated in some way, or necessitating some form of operative interference.

Here, besides relieving pain, an anæsthetic greatly facilitates manipulations of all sorts. That very relaxation which is otherwise an evil is here of great use; especially is it so in the operation of turning. Of all operations, perhaps, it is more advantageous in cases of version than in any other; but at all times, whether for craniotomy, cephalotripsy, high forceps operation, or the introduction of the hand into the uterus, fully induced anæsthesia gives great assistance to the operator, and much ease to the patient, enabling her to undergo the operation without movement or shock. Again, besides obviating a tendency to the two complications—spasm of the cervix and puerperal convulsions—chloroform constitutes the best and speediest mode of treatment for both of these conditions when they arise; the first by relaxing tissue, and the second by abolishing the reflex excitability of the nervous system.

The disadvantages are—1st. The great tendency to the production of *post partum* hæmorrhage, as already mentioned; and 2ndly. A fresh one—in the way it muffles and obscures the pains, so that we cannot tell the precise moment to aid nature with our efforts. This applies mainly to the group of forceps operations.

3. We now come to the question: What is the best anæsthetic to use and the method of its administration? The division of cases into normal and abnormal has a practical application; for in normal cases it is given solely with the object of relieving pain, and it is quite unnecessary to push the anæsthetic to loss of consciousness; but in abnormal cases, besides relieving pain, it is given as part of the treatment, and complete anæsthesia must be induced.

The best kind of anæsthetic to use has hitherto been pretty well agreed upon; for, although many drugs have been suggested, chloroform has justly carried off the palm. Of the two commoner anæsthetics, chloroform and ether, we know that, whereas chloroform tends to produce death suddenly by cardiac paralysis or syncope, ether, in most cases, tends to death by choking

* Churchill (*Theory and Practice of Mid.*, fifth edition, p. 236), and Leishman (*System of Midwifery*, second edition, p. 822) deny this; others agree in the above statement. I offer an explanation for the discrepancy in the next paragraph.

* Read before the East Surrey District of the South-Eastern Branch.

up the lungs or larynx. In the fatal syncope of chloroform, all is over in a moment; artificial respiration or anything else is of little or no avail. But, in the asphyxia of ether, by pulling the patient's tongue forward, rolling him over on his side, and, lastly, by artificial respiration, we can almost always restore him. And this constitutes the only, though great, advantage of ether over chloroform in ordinary cases. But these arguments do not hold in labour, for it is now well known that chloroform has but little tendency to the production of fatal syncope in pregnant women; a fact which may be accounted for, partly by the cardiac hypertrophy that always accompanies pregnancy, and partly by the absence of anything like terror in the excitement of the moment. On the other hand, the disagreeable irritation of the lungs which ether produces, and the struggling and length of time it takes to produce anæsthesia (especially in unaccustomed hands) constitute very great objections to its use in parturition. Some, however, still prefer it, and no doubt it is of much value when for some reason chloroform cannot be given. Methylene dichloride has been tried, and found wanting; and you will find the merits of nitrous oxide expounded by Dr. Macan in the *JOURNAL* for February 2nd of this year. Chloral is useful during the first stage—at which time chloroform is not advisable—and is warmly supported by Dr. Playfair.* Its action is the same as chloroform, and it is safer, but it is also much less speedy and efficacious.

The method of administration of chloroform must differ according to the purpose we have in view. If the relief of pain be our only object, its partial administration may be effected either by giving the crude drug in small quantities, or by diluting it to the appropriate strength with alcohol.† This latter method has the advantages of being safer and more exact. The alcohol, also, in some degree, counteracts the depressing influence of the chloroform. I believe the most convenient proportions to be equal parts by measure of chloroform and rectified spirit; and there are two small practical points worth note: (1) the addition of some aromatic serves to make the mixture more agreeable, perhaps to prevent sickness, and to avoid confusion with pure chloroform; (2) add the chloroform to the spirit, so as not to get a precipitate.

Concerning the inhaler, the simplest is the best. A perforated box with a pad of lint inside, or handkerchief folded will do, or Skinner's inhaler and drop-bottle are convenient. There is no need for a special administrator in these cases; the patient can give it to herself. Direct her to take half a dozen deep inhalations, and then, as she becomes drowsy, the inhaler drops off, and the administration ceases. An useful test of the effect produced is her power of conversation.

In normal cases, chloroform should not be given in the first stage, when it materially interferes with the mechanical dilatation of the os. In the second stage, it may be given at any time, and becomes especially necessary towards the end, as the head passes the vulva. Much of the success, or the reverse, depends on the precise moment at which the administration is stopped. If too early, the patient is unrelieved during the most painful period of the whole labour; if continued too long, you run the risk of hæmorrhage. In the third stage, it is not called for at all, except, perhaps, in some cases of retained placenta from hour-glass contraction.

In abnormal cases, where it is desirable to produce complete anæsthesia, the crude drug must be administered; and it is of the utmost importance for one person to devote his attention entirely to the anæsthetic. The mode of administration differs in no way from ordinary cases, except, perhaps, for the length of time it may be given.

In conclusion, allow me to indicate, by way of summary, what I believe to be the main precautions, whose observance would render the use of chloroform perfectly justifiable.

1. There are certain women who have a tendency to flood at every confinement, and others in whom there seems an already too great relaxation of fibre—weak anæmic females in their eighth or tenth confinement; and to these it would be unadvisable to give chloroform, except for necessity. Happily, it is not these women who suffer the most pain, but rather those strong healthy primiparæ whose pelves and general build approximate to the masculine type.

2. We should not give it when labour is complicated with severe vomiting, or with acute disease of the heart or lung, unless there be imperative call for it.

3. It should not be given to the full extent, except for operation, convulsions, or spasm of the cervix; and then it is most necessary that one person should devote his entire attention to it.

4. The inhalation should be stopped directly we find the pulse becoming very weak, or the respiration irregular.

5. Anything which makes us suspect a fatty or enfeebled cardiac wall should make us cautious in the use of chloroform. Here, as in cases other than those of labour, it is not the most extensive valvular disease (so long as it be attended by compensating hypertrophy), but the atrophied or degenerate wall that constitutes the source of danger. Unfortunately, the signs of these conditions are subtle and uncertain; but a fatty heart may be suspected by an exceedingly feeble cardiac impulse, combined with an almost inaudible first sound; or attacks of dyspnoea, vertigo, and syncope, in the absence of anæmia, or valvular lesion; or the copious deposit of fat in other parts of the body, and the occurrence of dropsy without adequate cause. A dilated heart may be suspected by increased area of præcordial dulness, combined with epigastric and venous pulsation, and a want of correspondence between the violence of the cardiac impulse and the strength of the pulse. Pericardial adhesions also form a great source of danger. They may be suspected when the heart's apex is fixed above its normal position, and does not shift with respiration; or when there is depression instead of protrusion of intercostal spaces over the position of the apex, giving a wavy character to the cardiac impulse.

6. The sixth and last precaution I would mention is this. In all cases we should take extra care to prevent the occurrence of hæmorrhage after birth; by giving a full dose of ergot in a little warm water when the head reaches the perinæum; by ceasing the chloroform immediately it is born; and by rousing the patient from her lethargy as soon as possible.

A CASE OF GANGRENOUS VARICELLA.

By WARRINGTON HAWARD, F.R.C.S.

Surgeon to St. George's Hospital.

A. W., aged 1 year, was admitted under my care at St. George's Hospital, on March 14th, 1883, on account of a number of gangrenous patches upon the skin.

The child was miserably ill-nourished, very dirty, and very ill; it weighed only six pounds and a half. On the left side of the scalp was a large scab, which, on being removed, discovered a deep ulcer, evidently formed by the confluence of several circular sores. On other parts of the scalp, and also on the face, were numerous circular scabs varying in diameter from a quarter to half an inch, covering similar ulcers. On the chest, abdomen, and back, were a number of black gangrenous patches of circular outline, of from half an inch to an inch in diameter, which in some parts were just becoming confluent. The skin around these patches of gangrene was of a dusky red colour. The larger of the gangrenous spots were all upon the skin of the abdomen. Beside these patches, there were scattered over the trunk and limbs numerous small scabs like the ordinary varicella spots in the drying stage, and also a few small vesicles and papules. The child was frequently sick; the pulse rapid and feeble; temperature 104°; and there was dulness to percussion over the base of the left lung.

The history was as follows. The parents were healthy, I saw the mother, who looked in good health. She had had six children, of whom three were dead from infantile diseases. The two other children were said to be healthy. This child had been puny and sickly from birth, and had never thriven. It was vaccinated in January, and the vaccination-spots had, according to the mother's description, run a perfectly natural course, and healed well. A week before its admission to the hospital, a crop of small red spots, of the size of a pin's head, came out on the child's face, chest, and abdomen. These afterwards became small blisters, resembling, the mother said, "vaccination-spots at the end of a week from vaccination." The mother did not know of any other children in the house or among her friends having chicken-pox. The spots became black, and began to increase in size, about the fourth day of the eruption.

When I saw the child, I was at once struck by the resemblance of the eruption to that represented in the picture accompanying Mr. Hutchinson's paper on Gangrenous Eruptions in connection with Chicken-pox and Vaccination, in the *Médecine Chirurgicale Transactions* (vol. lxx, p. 12); and this, with the history of the case, led to the diagnosis of gangrenous varicella.

The child died on the fourth day from admission, and at the post mortem examination I discovered that the child had been seen, as an out-patient on the third day of the eruption by the house-physician, who had recognised the case as one of ordinary varicella.

* *Prin. and Prac. of Med.* Second Edition, vol. 1, page 343.

† I believe originally suggested by Sanson (*Chloroform*, 1866.)