

energetically that the crescents have no chromatin substance, and on this ground he advanced the idea that they are sterile forms. It is not easy to understand how this observer could have arrived at such a conclusion, seeing that he used a method of examination practically identical with that employed by us and which has given exactly contrary results in our hands. Perhaps the reason lies in this—that Ziemann, working with preparations dried immediately after they were taken, failed to see the chromatin, concealed, as it probably was, in the midst of the rods and granules of black pigment surrounding it. On the other hand, in our preparations which were kept in the moist chamber the nucleus of the crescents as also the body itself being swollen up and the rods of pigment separated from one another the chromatin is rendered evident, becomes more or less swollen, and is stained by the method of Romanowsky in a typical way.

We shall not now enter upon a discussion of the significance which these structural characters permit us plausibly to attach to the crescents and mobile filaments.<sup>4</sup> It will be easily understood that those observers who, like Manson, look upon the flagellates as the first phase in the extra-corporeal life of the malarial parasite will find in these new facts fresh argument in support of their opinion. But we hold at the same time that they must not be considered as necessarily irreconcilable with Bignami's own hypothesis as to the significance of the semilunar bodies, especially when that hypothesis is studied in the more complete form in which it is presented in the last article written by us upon this subject.

Bignami's first hypothesis has been misunderstood by many, as Thayer and Hewetson justly observe.<sup>5</sup> We have indeed favoured the idea that the semilunar bodies are sterile on the grounds that one never sees in them any form of multiplication and that they have no relation to relapses; and these assertions, even in the light of these new observations, we still hold by as in accordance with the truth. In other words, we contended that the crescents are sterile bodies *in man* and *as far as man is concerned*. In fact, we put forward the additional hypothesis<sup>6</sup> that these bodies represent those phases of the life of the malarial parasite which in other parasites are continued and completed outside of the host. Should such migration from the host fail to occur, then that phase of life which cannot be completed except in the outside world or in a new host will be carried out in an abortive way and will terminate in forms of degeneration.

Certainly these new researches render probable the hypothesis that the cycle commenced in the blood of man is completed in some species of mosquito,<sup>7</sup> but they nevertheless do not negative the truth of the fact alluded to in our first hypothesis in those cases where the passage from man to the new host fails to take place.

Rome.

<sup>4</sup> A complete account of the results of these researches, not only in regard to crescents and flagellates but also to the structure in general of malarial parasites, will shortly be published in the *Bullettino della Reale Accademia Medica di Roma*.

<sup>5</sup> W. S. Thayer and J. Hewetson: *The Malarial Fevers of Baltimore*. The Johns Hopkins Hospital Reports, 1895, p. 215.

<sup>6</sup> *Loc. cit.*, p. 37 of the extract, et seq.

<sup>7</sup> Since the above was written we, along with Grassi, have succeeded in demonstrating that the semilunar bodies do actually develop in the middle intestine of a mosquito (*Anopheles claviger*). It is probable that this is the same species as Ross's "dappled-winged" mosquito, in two of which he observed a similar development. These facts allow us to accept the above inferences with less reserve.

**OPENING OF VICTORIA HOSPITAL, KINGSTON-ON-THAMES.**—On Monday, Dec. 12th, the Duke of Cambridge opened the Victoria Hospital, Kingston-on-Thames, erected by the inhabitants as a memorial of the Queen's long reign. The site for the new building was presented by his Royal Highness. The freedom of the borough was conferred upon his Royal Highness who was subsequently entertained by the mayor at luncheon.

**DIPHTHERIA IN SWANSEA**—The epidemic of diphtheria shows no signs of diminution and is exciting considerable anxiety in the town. Last week 37 cases were reported, against 39 in the previous week. The *Herald of Wales* complains that the medical officer of health, Mr. Ebenezer Davies, has directed that no particulars as to cases of disease notified shall be given to the press on the ground that notifications are private information.

## ON THE ADMINISTRATION OF A CERTAIN MIXTURE OF CHLOROFORM AND ETHER IN GYNÆCOLOGICAL OPERATIONS BY MEANS OF A CLOVER'S INHALER WITHOUT THE BAG.<sup>1</sup>

By W. J. McCARDIE, B.A., M.B., B.C. CANTAB.,  
ANÆSTHETIST TO THE GENERAL HOSPITAL AND TO THE DENTAL  
HOSPITAL, BIRMINGHAM.

IN view of the great increase of the records of death during the administration of anæsthetics, methods and statistics, especially when obtained from large numbers of cases and classes of patients, have exceedingly great value, and I propose, with apologies for some reiteration in what follows, to give the results partly of my own experience and partly of the experience of others in regard to a particular anæsthetic mixture and the special method of using it. Mixtures containing chloroform and ether, although viewed with disfavour by many administrators as being neither the one thing nor the other, have certain undeniable advantages, more especially when they contain ether in an effective proportion. In the German statistics now to be quoted the fact that the mixture shows a smaller death-rate than either ether or chloroform given separately points, in my mind, to the inference among others that an efficient quantity of ether had been added to the chloroform. Before describing and considering the method mentioned at the head of this paper I will first touch on several points in connexion with anæsthetic mixtures containing ether and chloroform.

German statistics of anæsthetics from 1890 to 1897, collected from scores of thousands of cases, give the death-rate in the following proportions according to Haenkel<sup>2</sup>: chloroform, 1 in 2039; ether, 1 in 5090; ether + chloroform, 1 in 7594. The Austrian mixture of ether one part, chloroform three parts, and alcohol one part is not included in the above statistics, for it contains only a small and probably ineffective proportion of ether.

Statistics of fatalities during the administration of anæsthetics notoriously vary greatly, and though the figures given may not be absolutely correct, yet if all unrecorded cases were published and added to the above figures I believe that probably the number of deaths would be found to be double those indicated by the above figures. In any case probably the proportion of deaths under chloroform to those under ether and the mixture is about right, and we may conclude that a mixture of ether and chloroform in which a sufficient quantity of ether is included forms probably the safest anæsthetic in common use for ordinary surgical work, for on the one hand the very real after-perils of ether are much diminished and the present dangers of chloroform are by its dilution and the addition of the stimulating ether in great measure obviated. It will be said that the administration of ether in suitable cases by men accustomed to its use has practically very little of danger and no doubt to a very large extent this is so, but much practice is needed to give ether with any great degree of comparative perfection and in such a way as to minimise the possible and real danger of after-bronchitis and pneumonia, more especially in abdominal cases. We therefore have not to consider the administration of anæsthetics by the specialist but as forming a part of the everyday work of the surgeon, house surgeon, or practitioner. Statistics of the Germans and practical experience go far to show that a mixture in all cases freshly prepared, such as the A.C.E. or a mixture containing ether and chloroform in which the ether is present in rather greater proportion than in the A.C.E. mixture—say in the proportion of 2 to 1 or 2½ to 1—is reasonably safe and probably the safest anæsthetic for routine use. Several cogent reasons are: (1) both ether and chloroform are diluted; (2) are given with plenty of air; (3) there is less chilling and irritation of the air-passages than when ether is given alone; (4) the breathing is more obvious than when chloroform alone is given; (5) the pulse and respiration are rather stimulated than depressed; and (6) the

<sup>1</sup> A paper read before the Birmingham Branch of the British Medical Association on Nov. 10th, 1898.

<sup>2</sup> *Handbuch der Inhalations-Anästhetica*, second edition, p. 61.



methylated ether may be used with as good results as the rectified preparation. 2. The quantity is to be measured and used in exactly the same way as pure ether, except of course that the bag is not utilised and that the face-piece is not removed for air supply. 3. The body of the inhaler should be previously warmed unless the room be hot or the patient weak. 4. The face-piece must fit accurately and be kept in exact apposition to the face during the whole of the anæsthesia. 5. During induction of narcosis the indicator must be moved on much more rapidly than if ether were being given until it reaches "full," and be kept there till anæsthesia occurs. 6. When this happens the indicator in many cases can be brought back to "3," or even to "2," and kept there throughout narcosis. In some cases it has to be kept at "full," and in others even thus the patient cannot be kept fully anæsthetised unless artificial heat—e.g., a hot towel—be applied to the body of the inhaler to increase evaporation. The anæsthesia obtained is very like that following the use of the A.C.E. mixture, the pulsé and respiration being stronger and more rapid than in the case of chloroform narcosis, and the colour as a rule is excellent throughout.

*Advantages of the mixture.*—1. It is very pleasant to the smell and taste and non-irritating to inhale in ordinary doses. 2. Induction of anæsthesia, in women at any rate, is rarely accompanied by excitement, rigidity, or struggling. The mixture compares favourably in these respects with the A.C.E. mixture, and whether the absence of those untoward symptoms is solely due to the absence of alcohol or is owing to this fact acting together with another—viz., that the musculature of women is generally weaker and far less used than that of men, is doubtful to my mind. 3. A quiet anæsthesia is obtained, very suitable for most operations, including laparotomies and perineal procedures, for there is no rapid heaving abdominal respiration as is the case with ether, and yet there is a distinctly stimulating effect as compared with chloroform. 4. In my experience patients suffering from most forms of heart trouble or from slight respiratory lesions, or even from bronchitis of moderate degree, take the mixture very well. Indeed, in most cases in which ether or the A.C.E. mixture is generally given this mixture acts admirably. I personally see no objection to its use in marked cases of renal disease. 5. After-effects of any kind are very rare, and I really cannot hear of any serious or even comparatively severe sequæ attributable to administration; even if these happen in slight degree they are neither as persistent as those following the use of chloroform nor as troublesome as those after ether, considering that after-effects of serious character, especially in the form of respiratory troubles, are more likely to follow laparotomies than other operations and that about 50 per cent. of the cases quoted were operations of this nature, it is an important advantage to be able to predicate this point. 6. Owing to the fact that comparatively little chloroform is used noxious fumes of carbonyl chloride and hydrochloric acid are not so abundantly given off as when chloroform alone is given—say in a small, badly ventilated, and gas-lighted room. Again, there is less danger of ether vapour from the mixture catching fire in the presence of a fire or light than if it were being administered in the pure state.

*Advantages of the method.*—1. It is more convenient than any other way of giving the mixture; the apparatus can be managed with one hand and it needs very seldom to be removed for replenishment. 2. The quantity of the anæsthetic given can be accurately graduated and kept constant and is strictly limited to a certain moderate amount in the majority of cases; these I regard as most important points. 3. The utmost limit of quantity is in most cases little above that needed to maintain anæsthesia—i.e., the safety point can be only in small degree exceeded—and in very many instances that limit is practically the full quantity necessary for the purpose of anæsthetisation or even slightly below it, so that heat has to be applied to the apparatus to increase the rate of evaporation. 4. Thus it is generally difficult to give too much or a sudden overdose of the anæsthetic, and supposing that the operator has an inexperienced administrator or is operating without skilled assistance he can well induce anæsthesia himself and, putting the indicator to, say, "3," tell the anæsthetist or attendant to keep it there. If imperfect narcosis happens one can tell him to put the indicator at "full." 5. Anæsthesia is as easily and rather more quickly produced than by giving the A.C.E. mixture in the ordinary way—viz., by means of a Skinner's mask and Silk's inhaler.

*Disadvantages of the mixture.*—These are as a rule very few and slight in practice, as the difference in rate of

evaporation of chloroform and ether does not seem to come into play to any extent. In very marked bronchitis or other pulmonary affection or in very old people or very marked cases of abdominal disease—e.g., large ovarian tumours or cases complicated by abdominal distension—the mixture is as safe as the A.C.E. mixture. Mild bronchitis is the chief sequela and is rare. I have not heard of pneumonia as a sequela. This lesion, on the other hand, is comparatively frequent after long laparotomies performed under the influence of ether. In a very few cases, especially in alcoholics, anæsthesia is imperfect and one must either increase the proportion of chloroform or adopt some other anæsthetic.

*Disadvantages of the method.*—These are likewise few. 1. In a cold room or with very strong or rather alcoholic women one has sometimes to warm the reservoir before use or afterwards to apply a hot towel to it. 2. It is not much good for strong or alcoholic men. I have not used it at all for children. There is no apparent danger in breathing the mixture, into which chloroform enters so largely, through the comparatively narrow air channels of a Clover's apparatus; as elsewhere remarked, the bag is even as a routine practice used by one skilled administrator until full anæsthesia has been induced, thus for a few minutes cutting off the air-supply altogether. Such a proceeding is the result of experience, not of following strictly the ordinary canons of anæsthetisation. The conditions generally held to contraindicate the use of the mixture are those in which by the majority of practitioners the administration of ether is contraindicated. This tends to show indirectly the distinct influence and efficacy of the proportion of ether present. Briefly, the mixture is not given in cases of marked pulmonary or renal disease or to old people or children. In all these conditions chloroform is to be preferred. Ether is practically never used by those who incline to this method of anæsthetisation, chloroform being the alternative anæsthetic. As during the administration of all anæsthetics untoward events may and do occur, so with this mixture. There have been times when there has been great anxiety for the patient, when artificial respiration and other means of resuscitation have had to be resorted to, and when another anæsthetic has had to be substituted for the mixture, but so far as I can learn causes for uneasiness do not arise so frequently as during the ordinary administration of ether or chloroform alone, and the general opinion of the surgeons who operate during narcosis produced by this method is most favourable—indeed, they have more confidence in it than in any other anæsthetic and their experience, individual and collective, of other agents as well as of this mixture has been large.

Mr. Lawson Tait's large experience of chloroform, ether, bichloride of methylene, and this mixture induced him to write to me as follows: "Then [i.e., about the year 1882] we found a mixture do well—2 ether and 1 chloroform—and that I believe is the best of all anæsthetics, save in old age and damaged kidneys, for all kinds of work. I think if introduced by nitrous oxide it would be an ideal anæsthetic." The opinion and experience of the many other gynæcologists in the Midlands who use the mixture coincides with that of Mr. Lawson Tait. Personally I have used the mixture in a good many cases of operations on women and very occasionally have administered it to men, and have formed a high opinion of its merits for gynæcological operations as given by the method described. In only one case, that of a very alcoholic woman, have I not been successful in inducing anæsthesia, but was obliged to resort to chloroform. Its chief demerit is to my mind the trouble of applying heat to the apparatus if the room be cold or the patient strong or rather alcoholic. One skilled administrator often uses the bag until the patient is anæsthetised, affirming the safety and humanity of rapid induction of anæsthesia. Equal parts of chloroform and ether have been given by this method and more than once, I believe, even pure chloroform, without untoward result. Finally, the procedure described seems to fulfil its object admirably in a certain class of patients—viz., women subjected to more or less the same kind of operation (i.e., abdominal or gynæcological)—and that much-to-be-desired end, that of making it difficult to give too much of the anæsthetic, is in many cases partially and in some cases wholly attained without the use of novel or cumbrous apparatus or the adoption of inhalers which require constant watching and draw the attention of the administrator from the condition of the patient.

I must now express my indebtedness and thanks to Mr. Lawson Tait, Dr. Thomas Savage, Dr. A. E. Clark, Mr. J. W. Taylor, Mr. Christopher Martin, Mr. J. Furneaux Jordan,



Dr. Frederick Edge, and to the committee of the Birmingham and Midland Hospital for Women for kindly allowing me to make use of their records in order to compile the statistics and also for giving me much information on the subject of this article.

Birmingham.

## ON THE PREVENTION AND CORRECTION OF SHORT LEG IN HIP DISEASE.

By ROBERT JONES, F.R.C.S. EDIN.,

HONORARY SURGEON TO THE ROYAL SOUTHERN HOSPITAL, LIVERPOOL.

No matter what care may be taken in the early treatment of hip-disease a certain amount of subsequent deformity seems inseparable from a large number of the cases. The percentage is variously stated by different authors at between 70 and 80. Doubtless certain factors tend to lessen this estimate, prominently amongst which may be placed an early diagnosis and treatment and the efficient mechanical control of the limb. I am obliged to admit that in my own practice until lately in a proportion of cases (certainly a small one) even where a patient has been presented to me without appreciable deformity I have been powerless to prevent

FIG. 1.



A. B., aged twenty four years. Practical shortening 4 in.

shortening. That my experience is not unique is proved by the literature of the subject and by the continued efforts made by surgeons at home and abroad to devise methods for the prevention of short leg. Of one thing we may rest assured that however effectually we may by mechanical means modify deformity in active arthritis much more radical measures are required where the joint is sound but ankylosis and deformity remain. It is with the view of endeavouring to simplify the methods of preventing adduction and to facilitate its correction once it has occurred that I submit this statement for considera-

tion. The deformities which constitute short leg comprise all or most of the following conditions—viz.: flexion, adduction, internal rotation, tilting of pelvis, and arrest of growth. The first four of these conditions—viz., flexion, adduction, internal rotation, and tilting of pelvis—I venture to think may in the future be

FIG. 2.



Same case as Fig. 1. After transtrochanteric osteotomy. No practical shortening.

avoided where we have an early case to deal with. Obviously, we can only modify the shortening caused by arrest of growth by deflecting the pelvis sufficiently to ensure apparent equality of the limbs. Without entering into a discussion as

FIG. 3.



A boy, aged ten years. 4 in. practical shortening.

to the causes of short leg I would state that, contrary to the teaching of surgeons, it often occurs without the complication