2. These points include the presence of an anoxaemic state, and a resultant increase in sarcolactic acid either locally or generally.

3. We produce evidence from experiments, both *in vitro* and *in vivo*, that sarcolactic acid is haemolytic—in the former case to whole human blood, and in the latter to whole animal blood.

4. Intravenous injections of sarcolactic acid into rabbits have produced haemoglobinaemia and haemoglobinuria, followed by recovery of the animals.

5. On the evidence brought forward by us, we conclude that sarcolactic acid is the causal agent in the production of the haemolysis in blackwater fever and these haemoglobinurias.

6. The etiology of various types, symptoms, and complications of blackwater fever is discussed in the light of this mechanism.

REFERENCES.

- ¹ Marchiafava, E., and Bignami, A. (1894): *The Parasites of Malarial Fevers*, p. 103.
- ² Christophers, S. R., and Bentley, C. A. (1908): *Sc. Mem.* 35, Off. Med. and San. Gov. Ind., p. 178.
- ³ Marchiafava, E., and Bignami, A. (1894): *Op. cit.*, p. 218.
- ⁴ Bass, C. C. (1914): *Amer. Journ. Trop. Dis. and Prev. Med.*, vol. i, p. 546.
- ⁵ Thomson, J. G., and Thomson, D. (1913): *Ann. Trop. Med. and Parasitol.*, vol. viii, p. 515.
- ⁶ Clarke, H. C. (1915): *Journ. Exper. Med.*, vol. iv, p. 427.
- ⁷ Blacklock, D. B., and Gordon, R. M. (1925): *Ann. Trop. Med. and Parasitol.*, vol. xix, p. 37.
- ⁸ Panton, P. N., Maitland-Jones, H. G., and Riddock, G. (1924): *Lancet*, vol. i, p. 529.
- ⁹ Hastings, A. B. (1921): *U.S. Pub. Health Bulletin*, No. 117, p. 40.
- ¹⁰ Stephens, J. W. W. (1927): *Trans. Roy. Soc. Trop. Med. and Hyg.*, vol. xx, p. 401.
- ¹¹ Hill, A. V. (1924): *Proc. Roy. Soc.*, B, 96, p. 438.
- ¹² Furusawa, K., Hill, A. V., Long, C. N. H., and Lupton, H. (1924): *Ibid.*, B, 97, p. 167.
- ¹³ Hill, A. V., Long, C. N. H., and Lupton, H. (1924): *Ibid.*, B, 96, p. 455.
- ¹⁴ Hill, A. V., Long, C. N. H., and Lupton, H. (1924): *Ibid.*, B, 97, p. 84.
- ¹⁵ Clausen, S. W. (1925): *Amer. Journ. Dis. Child.*, vol. xxix, p. 761.
- ¹⁶ Macleod, J. R. (1921): *Amer. Journ. Physiol.*, vol. 55, p. 184.
- ¹⁷ Panksi (1830): *Wells. Chem. Path.*, p. 329.
- ¹⁸ Barcroft, J. (1926): *Lancet*, vol. i, p. 544.
- ¹⁹ Hoskins, R. G., and Lee Gunning, R. E. (1917): *Amer. Journ. Physiol.*, vol. xliii, p. 303.
- ²⁰ Cramer, W. (1926): *Brit. Journ. Exper. Path.*, vol. vii, p. 88.
- ²¹ Thomson, J. G. (1924): *Res. Mem. Ser.*, vol. vi, Lond. Sch. Trop. Med., p. 107.
- ²² Ramsden, W., Lipkin, J., and Whitley, E. (1918): *Ann. Trop. Med. and Parasitol.*, vol. xii, p. 223.
- ²³ Roth, G. B. (1912): *Journ. Pharm.*, vol. iv, p. 157.
- ²⁴ Christophers, S. R., and Bentley, C. A. (1908): *Op. cit.*, p. 68.
- ²⁵ Barratt, J. O. W., and Yorke, W. (1909): *Ann. Trop. Med. and Parasitol.*, vol. iii, p. 153.
- ²⁶ Thomson, J. G. (1924): *Op. cit.*, p. 65.
- ²⁷ Thomson, J. G. (1924): *Res. Mem. Ser.*, vol. vi, Lond. Sch. Trop. Med., p. 112.
- ²⁸ Parsons, L. G., and Forbes, J. G. (1919): *Journ. Roy. Army Med. Corps*, vol. 32, p. 373.
- ²⁹ Stephens, J. W. W. (1913): *Ann. Trop. Med. and Parasitol.*, vol. vii, p. 479.
- ³⁰ Pearce, R. M., and others (1918): *The Spleen and Anaemia*, p. 71.

THE GUILLOTINE AND ETHYL CHLORIDE.

TEAM WORK FOR THE REMOVAL OF TONSILS AND ADENOIDS.

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THE following observations and description of methods for the removal of the tonsils (with the guillotine) and of adenoids (with the curette) are based on experience gathered from 13,500 cases operated on at Queen Mary's Hospital, Stratford.

The ages of the majority of the patients ranged from 1 to 15 years. The operations were performed by special team work in sessions of twenty-five to thirty patients; and the method has permitted of thirty patients being operated on in one hour. The efficiency of this team work necessitated two operating tables and a movable instrument table; four sets of instruments at least; a sister, a nurse, and a porter who is experienced in carrying in the theatre; one nurse in the waiting room; two nurses in the recovery room for the first twenty cases, with an additional nurse for every ten extra cases or part of ten.

Ethyl chloride was used in the entire series of cases, except for an occasional open ether for instructional purposes in operating. There has been one death. The patient, a girl of 19, was acutely poisoned by the ethyl chloride at the commencement of induction.

For descriptive purposes our observations will be made under the headings: Pre-operative, Operative, and Post-operative.

PRE-OPERATIVE CONSIDERATIONS.

Cases for operation are divisible into those with definite indications and those with indefinite indications.

Cases with Definite Indications.—These are the ordinary textbook cases: discharging ears, due to tympanic infection only, not complicated by attic disease, chronic mastoiditis, granular mucous membrane in the middle ear, aural polypus, enlarged tonsillar gland which is found at the anterior border of the sterno-mastoid about half an inch below a line drawn backwards along the lower border of the jaw, attacks of earache, deafness, frequent colds, snoring, and mouth breathing. The adenoid facies is becoming a rarity, and rightly, because its development signifies that the case has waited too long and changes have occurred in the shape of the palate, which becomes raised in the form of a high arch, thus causing deformity of the nasal septum above and crowding of the teeth below. Even in infants up to 6 months of age an indication that the adenoid tissue in the nasopharynx is excessive in amount is given by the state of the hair at the back of the head. The anoxaemia produced causes restlessness during sleep; as a result the hair is often worn off the occipital region, leaving a thin patch.

Cases with Indefinite Indications.—Many children are sent up for operation because they are not sufficiently bright, or they are not putting on weight, or they are too sallow and hollow-eyed.

Acute Tonsillitis.—In order to increase the percentage of tonsils completely enucleated by guillotine it is advisable not to operate within one month of an acute attack of tonsillitis, and preferably not for six to eight weeks. The amount of induration at the base of the tonsils is such as to make this region so ligneous that great difficulty arises in dislocating a tonsil from its bed, a process essential for its complete removal.

Nasal Diphtheria.—When examining large numbers of children nasal diphtheria is occasionally observed, usually in cases least expected. One case seen with a typical membranous rhinitis was brought up because the boy had been hit on the nose with a football the week before. One point in aid of diagnosis of this disease is that with few exceptions a florid red excoriated area of skin can be seen on the upper lip close to the columella of the septum. A typical membranous rhinitis is less common than an acute catarrhal rhinitis plus this excoriated area.

Patients selected for operation are given a list of instructions to follow; preparatory to operation and on the morning of operation the temperature is taken, the urine examined, and the chest auscultated. The urines are tested for albumin and sugar in groups of five, individual testing being carried out where any group shows a positive. About 6 or 7 per cent. of children show some transitory albuminuria, which may possibly be due to the preparatory starvation.

OPERATIVE TECHNIQUE.

The Anaesthetic.

As already stated, ethyl chloride was used except in a very few cases. Throughout the whole series the same inhaler was used, and the same brand of anaesthetic as supplied by Messrs. Duncan Flockhart. The one thing materially altered after the first few hundred cases was the method of administration.

The inhaler employed is called the "Queen's"; it was first used at the Queen's Hospital for Children, Hackney Road. It consists of a rubber bag, an L-shaped junction, and a facepiece. A strong red rubber bag is preferred for its durability and economy. The L-shaped junction has a movable device which permits of an easy regulation of air and anaesthetic, and is situated on the upper surface of the horizontal limb of the junction. Close to it, but nearer the bag, is the mouth of a tube which carries the ethyl chloride into the rubber bag, where it is soaked up by a swab of gauze held in forceps at the end of the tube. This soaked gauze is prevented from damaging the rubber bag by a wire cage. The

mouth of the tube is closed by a thumbscrew with a coarse thread.

The mask is fixed to the vertical limb of the junction. A celluloid mask with a pneumatic rubber facepiece is the best, but the latter should be solutioned on to the celluloid. This is important because, should the facepiece become slack, the air which will enter between it and the celluloid will materially affect the anaesthesia. When the gag is in position air can best be excluded by leaving the pneumatic cushion very slack or empty. A series of three sizes of masks is necessary, to range from the infant to the adult.

The Doyen type of gag, with a good ratchet which can be easily released, is found the most satisfactory. A quick release is necessary, so that the release of the ratchet and removal of the gag can be done almost simultaneously at the end of the operation. The gag which has been found most suitable, although still rather weak in its spring, is the children's size "Doyen" as supplied by Messrs. Mayer and Phelps. This gag has such good jaw range that it can be used as well for adults as for children.

The old airless method of induction, which was employed in the first few hundred cases, where the air was at once cut off and the induction concluded with stertor and dilated pupils, was soon superseded by a method with improved oxygenation, producing a better anaesthesia with no stertor, and where dilated pupils were looked upon as a danger point. With the old method artificial respiration and administration of oxygen were found necessary in about 10 per cent. of cases, whereas with the later method recovery is practically devoid of anxiety. With this more advanced method the quantity of anaesthetic agent required becomes greater.

Commencing with a patient from 1 to 3 years of age an initial dose of 10 c.cm. may be squirted down the tube. It is often found that this initial dose is inadequate to produce anaesthesia in a satisfactory time, owing to the fact that a great deal of the anaesthetic is absorbed by the gauze and some by the rubber, and also that the bag and inhaler have not become sufficiently heated by the exhalations of the patient and the manipulation by the anaesthetist. A further 5 c.cm. may be given for each child ranging from 3 to 7 years for the following eight to ten patients. After this the dose can be reduced to 4 c.cm. or even 3 c.cm., until the ages of the patients begin to rise again to 11, 12, and 13, when a return to 5 c.cm. will be necessary, and even again to 10 c.cm. if the age increases to 16. So it is obvious that in a session of thirty children they should be brought in for operation in regular order from the youngest to the oldest.

The patient is placed on his back and the gag is inserted between the left lateral incisor teeth. This position gives the best scope to the surgeon. The mask is slipped over the face so as to exclude entry of air beneath it; the air regulator of the inhaler is steadily closed, but not entirely, a slit the thickness of a visiting card being always left.

The two most important items to watch now are *breathing* and *colour*. The breathing may at first be rapid and irregular, or the breath temporarily held, but this alters with advancement towards induction. The colour will at once become heightened, and should remain so throughout the anaesthetic.

When the breathing has become regular and deep, the jaw relaxed (ascertained by opening the gag), and no palpebral reflex is observed when blowing on the eyelids, then the patient is ready for operation. In a very small proportion of cases the patient is ready for operation although the relaxation of the jaw is not complete and although the breathing is regular and deep and there is no palpebral reflex. In such cases the anaesthetic should not be pushed, or an overdose will result, and force will have to be used, either by the anaesthetist bringing his right hand into action to assist his left hand, or, preferably, by obtaining the assistance of the surgeon to open the jaw.

Difficulty in opening the jaw is experienced when the patient's under-lip is misplaced between the gag and the lower teeth. This is due to the anaesthetist failing to hold the patient's lower teeth tightly against the gag during induction. Should this happen it is as well quickly to release the gag and free the lip, as much to save the lip from injury as to anticipate a difficulty in respiration which occasionally occurs, attributable to this cause.

With the signs of completed induction as stated above, the pupils will usually be found contracted, or if with a slight tendency to dilatation they will contract rapidly to light. This stage of the proceedings is most important; the most urgent necessity is for the patient immediately to begin eliminating the anaesthetic by expiration, and continue to do so. Anything that impedes this elimination before the return of the reflexes means that the anaesthesia will get gradually deeper instead of lighter. Therefore it is important to realize the various ways in which the respirations can be impeded, in their order of occurrence.

The first respiratory difficulty may show itself at the very commencement of induction in cases where the tonsils are

meeting in the mid-line. In these cases induction has to be coaxed, and because elimination of the anaesthetic is obstructed a little anaesthetic will produce induction.

The next obstruction arises when the patient voluntarily holds the breath and then takes a sudden deep breath, for then the vapour is concentrated too suddenly. The effect is the same. A laryngeal spasm is set up, causing coughing where the breath is still held, and again the anaesthetic is prevented from being eliminated, so the patient will go quite deeply under with a small quantity of anaesthetic.

The third difficulty occurs in some patients when the jaw is extended by the gag. If this happens there should be time to remove the tonsils and turn the patient on the right side, but then the gag should at once be released until colour is again good and respirations steady, when the gag can be again opened and the adenoids removed. Each part of the operation will take from eight to ten seconds, which is the limit of time that the patient should be left with obstructed respiration. With a well-timed anaesthetic the patient should cry, cough, or struggle on removal of the gag.

Blood will be the fourth obstruction, and even at the end of the operation, although elimination of the anaesthetic has occurred satisfactorily the whole time, the patient will often go quite deeply under again although on the verge of the return of reflexes. This is an obstruction found mostly in young children, and is easily remedied by holding the child's legs well up to effect good gravity drainage and stimulating with a douche of cold water. Sometimes a swab on a holder may be found necessary to remove clots.

Occasionally a large flabby tongue will cause obstruction. No obstruction has ever been found due to a mass of adenoid tissue finding its way into the larynx.

Two points have emerged from observations during this series of cases: (1) When trouble occurs with ethyl chloride anaesthesia it shows itself first in the respiration. (2) In nine cases out of ten it is due not to the toxic effect of the ethyl chloride or to an initial overdose, but to some mechanical factor preventing elimination. Patients should not be removed from the table until the colour is good, and crying, coughing, or struggling has taken place. Salivation is quite rare, but undoubtedly the secretion set up by acute catarrhal conditions will be greatly increased, and if excessive will cause respiratory obstruction. This is why operation is well postponed, especially when young children are affected with acute catarrhal conditions, until the symptoms have subsided.

From the point of view of team work, and time, it is interesting to note that induction, timed over a series of cases, takes from thirty-five to forty seconds, and that this, added to a similar average period for the operation of from fifteen to twenty seconds, gives an approximate inclusive time of about sixty seconds. Another sixty seconds should suffice for the patient to be brought in and laid on the table, including also the return of reflexes and removal to the recovery room, showing the possibility of operating at the rate of thirty patients to the hour.

For such efficient team work it is necessary for the anaesthetist to assist the surgeon in his operating. To do this the anaesthetist's first action is to slip the inhaler into his lap. Then, with the patient on the back, to assist in the removal of the tonsils he should hold the head firmly between his two hands with the tips of the left fingers steadying the gag, the head being held at the most convenient angle for the surgeon.

As the surgeon is evulsing the tonsil the head can be turned either to the right or left to assist this manoeuvre. The patient being turned on the right side, his head is supported in the palm of the anaesthetist's right hand; leaving the occiput free for the left hand of the surgeon. The anaesthetist's left hand steadies the gag and is ready to release and remove it at the termination of the operation, when the head of the patient is handed over to the nurse. A point in technique at this stage which saves considerable time is to ensure that the nurse who is holding the kidney receiver against the patient's cheek, when the latter is on the side, shall press the receiver firmly against the cheek just above the anaesthetist's thumb. By doing this and receiving the patient's head promptly, the anaesthetist's hands are kept free from blood, thus avoiding the necessity of washing between each case.

Although the foregoing description with its detailed observances would lead some to consider that ethyl chloride was a difficult and dangerous anaesthetic to administer, it

must be remembered that whenever a detailed account of any act is written it invariably seems to make that act appear more complicated than it really is. The evidence over this large number of 13,500 cases shows that ethyl chloride may be looked upon as a safe agent for anaesthesia where the surgeon and anaesthetist work in unison. Also, where numbers of patients have to be dealt with and a quick recovery is necessary and the patients are to be sent home at the earliest possible time, ethyl chloride is certainly the anaesthetic to meet the circumstances, although it is more suitable for children up to 16 years than for adults. It is found that with the latter, although induction is quite easy, recovery is accompanied by a great deal of mental agitation and struggling. Children are also much brighter and fitter on the day after operation when ethyl chloride has been given than when ether has been administered. On the other hand, ethyl chloride is not the best anaesthetic for instruction in operating.

The Operation.

It is essential that a good source either of daylight or artificial light is so placed and so extensive in origin that the surgeon can work between the patient and the source of light without a shadow being cast. A table two or three inches too high is sufficient to interfere with the exactness of the most experienced surgeon.

Removal of Tonsils.—The guillotines used are Heath's reinforced Mackenzie pattern (blunted) in three sizes, and the removal is done by a continuous movement which resolves itself into:

- (a) Lift up the tonsil with the guillotine.
- (b) Push out the tonsil with the guillotine.
- (c) Push in the tonsil with the thumb or index finger of the opposing hand.
- (d) Shut home the blade with the thumb as much as possible.
- (e) Completely shut home the blade by adding the pressure of the other thumb.
- (f) Roll the guillotine outwards.

Bigelow epitomized the movements necessary for the reduction of a dislocated hip thus: "Lift up, bend out, roll out," and his words might be paraphrased for the technique of tonsillectomy as follows: "Lift up, push out, push in, roll out." An unusually fibrous tonsil may be helped from its bed during the last rolling movement by running the index finger of the free hand round the back of the guillotine and rapidly dissecting with the finger. This is better than using scissors at this stage, as scissors usually cut away some of the posterior pillar which has been twisted forwards.

Removal of Adenoids.—This is very often done imperfectly. The instruments preferred are: Jenkins's curette for the main mass; Beckmann's baby unguarded for the lateral pads; Seymour-Jones's tag forceps. Curettes should be very sharp and of two sizes—a large guarded curette for the removal of the main central mass, and a small unguarded curette which can feel its way into the lateral recesses and remove all the remaining adenoid tissue with one cut on each side. With the former a steady strong pressure is exercised, with the latter a much gentler force. By this means a complete removal is invariably effected and adenoid tags seldom left. After a time the surgeon can become expert in palpating with a curette, so that the amount of adenoid tissue removed can be estimated before the curette leaves the post-nasal space, and any deficiency below this be sought for in the form of a tag. To such an extent is this the case that the anaesthetist, who is holding the patient's head, can by transmitted impulse also feel what is happening in the post-nasal space, and be ready to register surprise when the "bag" falls below his estimate.

POST-OPERATIVE CARE.

On completion of the operation, should the patient show no return of consciousness, as evinced by crying, coughing, opening of the eyes, or struggling, a stimulus is useful in the form of iced water, which is allowed to splash on to the face from the height of a foot or so. While this is being done the nurse, who is supporting the patient's head, should close the left auditory meatus with a finger.

Method of Carrying and Holding Patient.

The porter plays a most important part in the technique of the team work, not only by holding and turning the patient, but also by removing the patient to the recovery room in such a way that all risk of respiratory obstruction from blood clot is reduced to a minimum. These manœuvres require rather careful studying. During induction the patient's wrists are held lightly by the side of the hips, and this is continued until the completion of the removal of the tonsils (Fig. 1). During

FIG. 1.

removal of adenoids, the patient having been turned on to the right side, the porter still continues to hold the patient's right wrist with his left hand, so that his left arm is encircling the patient's hips and his left hand is under the patient's right buttock. In his free hand the porter holds a towel in readiness for the removal from the table (Fig. 2). Passing his right hand

FIG. 2.

with the towel under the patient's head to the side of the mouth, and raising the body with the left arm encircling the hips, he carries the patient into the recovery room with the buttocks tucked well up into the porter's left axilla and the head resting face downward in the porter's right hand at a much lower level than the hips (Fig. 3).

FIG. 3.

After recovery is complete the patient is allowed to take the position of election, some lying down, others sitting up. Most children vomit some time after recovery, but this is almost always caused by the blood swallowed. Children can be sent home three hours after operation, except in those cases where the pulse is found to be poor, when it is safer to wait a little longer, or even to admit for the night where possible, or, if impossible, to remove home with

special care. It may be mentioned that a feeble pulse after recovery is more often found in patients of feeble or depleted physique, and would seem to be due more to this than to operation shock or effects of the anaesthetic.

Haemorrhage, Immediate and Late.

If bleeding is considered to be brisker than usual it is a matter of experience that in the large majority of cases it will cease rapidly if nothing is done. It is rarely necessary to hold a piece of gauze in the tonsillar bed, but this manœuvre will control those cases which do not cease.

With regard to late haemorrhage, the source of the bleeding must be looked for. Generally it is coming from the post-nasal space, and frequency of occurrence varies inversely with the sharpness of the adenoid curette, just as the frequency of tonsillar haemorrhage varies inversely with the bluntness of the guillotine. The treatment is to spray the post-nasal space with cold hydrogen peroxide (vols. 10) through the nose with an atomizer. If this fails, run the end of the index finger round the post-nasal space either to dislodge clots, which may be holding a vessel open, or to remove a half-detached tag. If the bleeding is from a tonsillar bed, apply pressure by means of a pad of gauze on a holder. Press gently at first, and increase the pressure gradually as the pharynx becomes used to the presence of a foreign body. If this fails, hydrogen peroxide (vols. 10) on gauze can be tried. Failing this, oil of turpentine can be used on gauze, combined with horse serum or haemostatic serum, intramuscularly. As a last resort, which in this series of cases has had to be used on one occasion only, a general anaesthetic must be administered and the bleeding point ligatured.

Points in After-treatment.

- (1) It is important to encourage the patient to eat and drink on the day following operation if possible. The throat is cleaned up by the muscular contractions involved thereby far more quickly than by any other method.
- (2) It is very important to keep the bowels open.
- (3) A shawl fastened around the head, which at the same time keeps the neck warm, is very comforting, especially when the glands of the neck are painful or earache develops.
- (4) Earache is divisible into (a) that immediately following operation, and (b) that occurring after a lapse of twenty-four hours. The former is due to some reflex nerve pain and the latter to infection. For both warmth is essential, and for the latter the further appropriate treatment.

A NOTE ON ECLAMPSIA.

WITH REPORT OF A COMPLETE POST-MORTEM EXAMINATION.

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DURING the year 1926-27 there were twelve cases of eclampsia in the Rotunda Hospital, with two deaths. In addition, there were 381 cases of albuminuria without death. Details of these are given in the annual report. We stated in this report that it is difficult to compare statistics of the present with those of the past when antenatal care was not customary, for we believe that many severe examples of present-day eclampsia would have been true eclampsias in the past. From March, 1927, until April, 1928, there was no eclamptic death in the hospital, and we hoped that we had finished with mortality. This was not to be, and the full notes of a fatal case are appended. The cases which we encounter nowadays are of marked severity. One of the two deaths in our last report occurred three and a half days after the woman had recovered from eclampsia, and the eclamptic toxin could not be held altogether responsible. In twenty-two cases since November, 1926, there were altogether three deaths—that is, 13.6 per cent., a percentage on which, with our treatment, it is possible to improve. If a woman has had

a fit and albumin is present she is included in the eclampsia statistics.

There are several features of interest in the fatal case under review, the most marked being that the *post-mortem* examination showed how impossible it was to achieve a successful result.

Case History.

A primipara, aged 24, was delivered spontaneously of a live child two hours after admission to the hospital. She had never attended the ante-natal department, and there was no history of previous illness. Routine examination of the urine revealed the presence of "solid" albumin. There was slight oedema. She vomited house mixture. The routine eclampsia treatment was given. Glucose was taken by the mouth. The result of colon lavage was never satisfactory (and a good result usually means a good prognosis). The first fit occurred six and a half hours after delivery, and there were eight fits altogether. There was a good deal of facial twitching. Three and a half hours before she died respirations ceased; the pulse continued comparatively good in tone and volume. In spite of continued efforts at artificial respiration (chiefly mouth-to-mouth) for three and a half hours she died. The other usual restorative measures—for example, oxygen, lobeine, etc.—were also resorted to.

We have never seen a case quite like this; we have often succeeded in resuscitating eclamptics apparently dead by clearing out the mucus from the throat, artificial respiration, oxygen, etc., but our efforts here were futile.

We were fortunate in being able to obtain a complete *post-mortem* examination, the result of which was as follows.

Findings at Necropsy.

The body was well nourished and fully developed; no marked oedema was present. When the abdomen was opened the uterus presented the usual post-partum appearance; it was normal in size, shape, and position. The adnexa were normal.

Liver.—The liver was enlarged, and weighed 1.878 kilograms (normal 1.2 to 1.4 kg.). Extensive subcapsular haemorrhages were most marked on the superior surface of the right lobe, and smaller areas were scattered all over the entire surface. On section, macroscopically the areas of haemorrhage were seen to be sprinkled evenly through the organ, giving an appearance of advanced nutmeg liver; the remaining liver tissue was of a pale buff colour. Microscopically the areas of haemorrhage were seen to be mainly in the periportal region of the liver lobule. In many lobules there was marked fatty degeneration of the liver cells in this region; there was also some haemorrhage in the centre of some of the lobules. The liver cells generally showed cloudy swelling, and in many of them the nuclei were undergoing karyolysis. Here and there through the section were seen vascular areas, probably haemangiomas. According to McCallum the poison of eclampsia destroys the cells of the liver lobule nearest the portal vein, and the scattered areas of haemorrhage correspond with the areas of necrosis around the periportal region. This agrees with our findings in this case. According to Schmorl the liver necrosis is due to syncytial masses swept from the placenta into the liver veins, but we have not found any evidence of syncytial tissue in our sections of the liver.

Gall-bladder.—Bile-stained; nothing abnormal.

Kidneys.—Weighed approximately 112 grams each; they were slightly enlarged, but the relationship of cortex to medulla appeared normal. The capsule stripped readily off both. The surface was covered with small subcortical haemorrhages, giving an appearance resembling flea-bitten kidney. Microscopically, there was much cloudy swelling and fatty degeneration of the renal epithelium, the vasa recta were congested, and there were some extravasations of blood in their vicinity. The glomeruli presented no marked abnormality, except that in some places there was seen a wide separation of Bowman's capsule. There was no evidence of haemorrhage in this region; according to some observers the primary renal lesion is a degeneration of the walls of the glomerular capillaries, but this was not manifest here. (McCallum merely mentions that necrosis of the renal epithelium is sometimes found in eclampsia.)

The *ureters* presented no marked abnormality to the naked eye.

The *bladder* was distended and thin walled; it contained approximately five ounces of bloody urine.

The *spleen* was normal.

Stomach.—Normal in position, size, and shape. There was an extensive subperitoneal haemorrhage on the anterior and posterior aspects. This was most marked at the cardiac end towards the lesser curvature; it extended downwards about a hand's breadth from the cardio-oesophageal junction, and was sharply limited above at this point. The wall was extremely thick and boggy to the touch. On opening into the cavity the entire mucous membrane, except for about two fingerbreadths at the pyloric end, was blood-stained, and the cavity contained about four ounces of dark fluid. There was no food present. A microscopical section of the stomach wall was made in the zone of haemorrhage. The wall was about 1½ cm. thick at this point, and a rather extensive area of haemorrhage was found separating the muscularis mucosa from the outer muscle coats. The lining mucosa was markedly oedematous, and showed some cloudy swelling.

The *duodenum*, *jejunum*, and part of the *ileum* were enormously distended with gas. The distension produced a wide separation of the parallel muscle fibres, giving a striated appearance to these parts. The mucosa of the duodenum also showed this dark staining. The ileum in its remaining twelve inches was empty and collapsed.