to be the case, were obtained without the slightest thought of any etiological significance.

Since obtaining cobra venom, I have had only a short time in which to confirm this work, but so far as I have gone I am in agreement with him. I will not give my results in detail at present, as I hope they will, when completed, form part of a future communication on the diagnosis *in vitro* of pregnancy by complement-fixation and haemolytic tests. Much of this work is already finished. I should, however, like to mention that the serum from a case of eclampsia (aged 27, primipara, 6 months, considerable mental clouding, labour pains absent) has quite failed to demonstrate this inhibition. Nor was this result due to any direct action of the eclamptic serum on the red cells in the absence of venom.

There is, then, very considerable evidence that the pregnant woman is protecting herself against a poison directly comparable to a venom, and on this ground I wish to suggest that there may be some therapeutic use for antivenin in eclampsia or the pre-eclamptic state. Judging from its action in snake poisoning, the likelihood of usefulness is very much greater in the latter. I make no apology for bringing forward this idea without having practically tested it. In a disease so relatively rare as eclampsia, the experience in treatment of any one man can count for little, and such a measure as I have suggested must be tried on a large scale to be proved or disproved. I would remind you that antivenin is as harmless as any other antitoxic serum, and may, and indeed should in eclampsia, be given in large quantity by intravenous injection. There is, of course, no reason for omitting any other therapeutic measure which may be considered advisable.

There is still one further suggestion which I would make as a result of this pathological study. The convulsions of eclampsia are in no way an essential of the toxæmia. Patients occasionally die quietly in coma with lesions identical with those found in cases of convulsive seizure. Arrest of the convulsions, therefore, is not necessarily antidotal, but has the merit of saving the patient's strength. It should be accomplished, then, in a way as little harmful to the patient as possible. It follows that anaesthetics, which are powerful cell poisons, are bad. The other two standbys in this regard are veratrum viride and morphine. While both are undoubtedly useful, neither is quite free from the breath of suspicion, and it appears to me that there may be some field for intrathecal injections of magnesium sulphate. These have proved useful in tetanus, and there is no reason why they should not prove of equal service in the treatment of eclampsia.

REFERENCES.

- ¹Leith Murray, *Journ. of Obstet. and Gyn. Brit. Emp.*, 1910, October.
²Pearce, *Arch. of Intern. Med.*, 1908, August. ³Pearce, *Journ. Med. Res.*, 1904, vol. xii, p. 329; *ibid.*, 1906, vol. xiv, p. 541; *Journ. Exp. Med.*, 1906, vol. viii, p. 64. ⁴Dudgeon, Pantou, and Ross, *Proc. Roy. Soc. Med.*, 1908, vol. ii, December. ⁵Nowak, *Ann. de l'Inst. Past.*, 1898, vol. xii, p. 369. ⁶Kilvington, *Journ. of Phys.*, 1902, vol. xxviii, p. 426. ⁷Elliot, *Lancet*, 1904, vol. i, p. 715. ⁸Flexner and Noguchi, *Un. of Penn. Med. Bull.*, 1903, vol. xv, p. 345. ⁹Bürgers, *Zeitsch. f. Immunitat.* (orig.), 1910, Bd. 5, H. 5, p. 648-649. ¹⁰Bauer, *Muench. med. Woch.*, 1909, No. 27.

SCOPOLAMINE-MORPHINE ANAESTHESIA IN LABOUR.*

BY

J. R. FREELAND, M.D. PENN.,

AND

BETHEL A. H. SOLOMONS, M.B. UNIV. DUB.,

ASSISTANT MASTERS ROTUNDA HOSPITAL, DUBLIN.

In the last few years great interest has centred around the administration of scopolamine during labour. At the suggestion of the Master of the Rotunda Hospital (Dr. E. Hastings Tweedy), we decided to study the subject, and propose to give an experience in a series of selected cases—namely, one hundred primiparae. We considered that tests of such a comparatively new anaesthetic would be of more statistical value if primiparae only were selected. The average duration of labour is longer than in multiparae, and the occurrence of un-

expected abnormalities, such as *post-partum* haemorrhage and adherent placenta, less common.

It may be asked why we present a record of only 100 cases since we began our study in September, 1908. Our answer is that we only administered scopolamine when the labour ward was quiet and comparatively empty, so that strict attention could be paid to mother and child. We excluded all patients who were quiet and undemonstrative, and all those who came in well advanced in labour.

We began with a dosage of scopolamine hydrobromide $\frac{1}{100}$ grain, and morphine sulphate $\frac{1}{4}$ grain. After trying various amounts we fixed on scopolamine $\frac{1}{120}$ grain and morphine $\frac{1}{4}$ grain as a safe and efficient dose. When repeated the morphine is omitted. Merck's preparation was used throughout. It is supplied in $\frac{1}{60}$ grain tablets. As we always made up a fresh solution for each dose, it was found convenient to use half a tablet each time. This accounts for our dose of $\frac{1}{120}$ grain instead of $\frac{1}{100}$ grain as usually advised. Other makers' preparations are no doubt equally good, but many contradictory symptoms occur from using different preparations of apparently the same drug. Therefore we thought it advisable to confine ourselves to one trustworthy preparation.

When dealing with a new procedure it is natural to follow authoritative teaching, and at the start we based our method of administration on Professor Krönig's paper, read before the British Medical Association meeting in 1908. In some of our early cases we unwittingly departed from accepted doctrines, and it was from these cases that we think we obtained some of our most valuable information.

In recording our cases we have paid attention to the following conditions:

1. The power of the drug to relieve pain.
2. Its influence on the force of the pains.
3. Its effect on the child, and particularly if this were manifested to a greater degree when delivery quickly followed the administration of the scopolamine.
4. The necessity for watching the patient.
5. The occurrence of abnormalities, such as delayed labour, forceps delivery, lacerated perineum, retained placenta, and *post-partum* haemorrhage.

I.—THE POWER OF SCOPOLAMINE TO RELIEVE PAIN.

In previous papers it has been suggested that complete amnesia with unconsciousness of pain is desirable. As a rule, this is only obtained and maintained by repeating the dose every two hours for two or three doses. We are satisfied with a slighter effect, and we consider the purpose of the drug fulfilled if the patient sleeps between the pains, waking up with more or less demonstration during the height of the contraction, and again falling to sleep when the pain is over. One dose sometimes suffices to cause somnolence, and often deep sleep during as well as between pains. We endeavoured to select patients that were particularly noisy and demonstrative, in order to be able to say definitely how much effect the drug had on the sensibility of pain.

The results were as follows: Ten women exhibited complete analgesia, having no knowledge of pain even when the child was born.

In 57 cases there was a marked effect; sleep between and often during the pains, with great decrease in suffering.

In 20 cases the effect was fairly good as regards relieving the pain to a certain extent, but the patients did not sleep at all.

In 13 cases there was no effect whatever. In 4 of these the drug was lost because of rapid vomiting. Eight received too small a dose; in none of them was it repeated. One patient, after two doses by mouth and one hypodermic injection of $\frac{1}{120}$ grain, $\frac{1}{120}$ grain, and $\frac{1}{120}$ grain respectively, showed no result.

Method of Administration.

Of the 10 patients exhibiting complete amnesia, 3 received one dose by mouth, 6 received one dose hypodermically, and 1 received two doses hypodermically. After mouth administration the shortest interval to elapse before delivery was an hour and a half, the longest six hours, and the average three and a third hours. The shortest interval after hypodermic injection was an hour

* Read before the Obstetrical Section of the Royal Academy of Medicine in Ireland, October 28th, 1910.

and a half, the longest fifteen hours, and the average six hours.

Of the total number of cases, 37 received the drug by mouth alone; 5 of these vomited. This cannot be said to result from the scopolamine, as other sedatives—for example, chloral, bromide, or laudanum—are often vomited when given by mouth during labour. Therefore hypodermic injection is only preferable when the patient shows a tendency to vomit, otherwise mouth administration is the pleasanter method. The results we obtained by the latter method were in every way as satisfactory as by the former.

II.—THE INFLUENCE OF THE DRUG ON THE UTERINE CONTRACTIONS.

The rules which we intended to follow in administration were that the membranes should be unruptured, the fetal heart normal, the os not more than three-quarters dilated, and the pains of normal frequency, strength, and duration—that is, pains every five to seven minutes, lasting forty-five seconds or more, the uterus contracting firmly with each pain. These data are observed by palpating the uterus for three or four successive pains. If only these cases are considered suitable for scopolamine, there must be omitted many cases of primary uterine inertia which are a source of annoyance and worry to the doctor and anxiety to the patient's relatives. To ensure good statistical results these patients should be omitted, but the atmosphere of quiet and comfort that is induced by the use of scopolamine makes them eminently suitable cases for its use. This we discovered in one or two of our early cases which at the time of administration we thought to be in strong labour, because of their noisy demonstrations. Scopolamine unmasks the true condition, and the relief of suffering with almost total disappearance of pains is disconcerting if the precaution of palpating the uterus before administering the drug is neglected. But contractions of ten to fifteen seconds' duration, with an outcry lasting one to two minutes, and slow dilatation of the os, enable one to recognize inertia. If scopolamine is used in these cases the delay should not be attributed to the drug. Opium and chloral have a somewhat similar effect.

For the sake of comparison, we collected a series of 100 consecutive primiparae from the first of the year, excluding those with eclampsia, macerated children, abnormal presentations, and *ante-partum* haemorrhage. In these cases the average duration of labour was 17 hours. The longest labour was 107 hours, and the shortest 2 hours. In the cases that received scopolamine, the average length of labour was 31 hours. The longest labour lasted 71 hours, and the shortest 5½ hours, giving an average of 14 hours' longer labour in the scopolamine patients.

This prolongation of labour can be explained by the inclusion of the cases of inertia mentioned, and the fact that we endeavoured to choose those patients least capable of bearing pain—in other words, those bound in any event to have a more or less prolonged labour. In addition, the 100 consecutive cases include a large number of patients who were admitted too far on in labour, or too quiet to need scopolamine. They also include a number of cases of rapid labour common enough in primiparae, but excluded as unsuitable for scopolamine. If we had selected 100 cases which would have been suited for scopolamine, but did not receive it on account of the crowded condition of the labour ward, the discrepancy would probably not be so marked.

III.—THE EFFECT ON THE FETUS.

Much has been written about the dangers to the fetus, but from our cases we conclude that this has been much exaggerated. One child was born in a condition of apnoea. Its birth occurred four and a half hours after a hypodermic injection of $\frac{1}{100}$ grain scopolamine and $\frac{1}{10}$ grain morphine. This effect is much more likely to have been due to morphine than scopolamine. It revived after hot baths and Schultze's artificial respiration. Two children were born dead, both delivered by forceps after delay in the second stage. Whenever a child dies as a result of delay in the second stage, it is undoubtedly due to an error in technique and should not be laid at the door of scopolamine. The drug was administered fifteen and twenty-six hours respectively before delivery, one hypodermic injection to each patient. These

were obviously cases of inertia, and this, and not the scopolamine, was the cause of death. In the other series there were also two deaths of children during labour, one delivered by forceps and one naturally.

IV.—NECESSITY FOR WATCHING THE PATIENT.

The statement has been made that the doctor must continuously watch a patient who is under the influence of scopolamine. If this be true, it immediately condemns the treatment in the eyes of most practitioners. But such care is unnecessary. The nurse should be instructed to keep a watch on the perineum for signs of pressure, as occasionally delivery occurs unexpectedly. If the patient is asleep she should be kept on her side to prevent the possibility of the tongue falling back, an occurrence common to all forms of anaesthesia. Abnormal mental effects were observed only in two cases, one patient becoming excited and talking incoherently for a short time. The other patient had an almost painless delivery, and about an hour later, after having been quiet and rational since delivery, got out of bed because she wished to use the bed-pan. She offered no resistance, and returned to bed immediately when told to do so by the nurse who was in the room. She said she knew what she was doing but had an irresistible impulse to leave her bed. She was quiet afterwards. There was no case of actual delirium.

A darkened room is supposed to be necessary for good results, but we never purposely kept the room dark, and we consider to do so would be a disadvantage, as it might possibly interfere with the nurse's watch for the complications indicated—that is, unexpected delivery and falling back of the tongue.

V.—THE OCCURRENCE OF SUCH ABNORMALITIES AS LACERATION OF THE PERINEUM, FORCEPS DELIVERY, RETAINED PLACENTA, AND POST-PARTUM HAEMORRHAGE.

It might have been expected that laceration of the perineum would be more frequent in patients delivered while under the influence of scopolamine because the absence of pain enables the patient to bear down more vigorously. There were 59 lacerated perineums, which is 14 per cent. more than our usual yearly average, 45 per cent.; but in the 100 primiparae we took for comparison there were 65 lacerations.

Forceps was applied nineteen times for delay in the second stage, as compared with nine times in the other series. This is again in most part due to the selection of the cases, and the inclusion of cases of inertia. Occasionally we have noticed delay in the second stage resulting from the patient not bearing down with uterine contractions; the absence of pain instead of making the abdominal muscles act more vigorously, that is, the usual action, caused cessation of voluntary effort, and keeping the patient awake, encouraging her to bear down and pressing on the fundus were sufficient to effect delivery.

Post-partum haemorrhage occurred twice in the scopolamine series, once after chloroform and forceps, once when the membranes were retained. The other series showed one *post-partum* haemorrhage and one manual removal of an adherent cotyledon remaining, after easy expression of the placenta at thirty minutes. The *post-partum* haemorrhage occurred after the administration of chloroform for the application of forceps.

The average length of the third stage was thirty-five minutes in the scopolamine cases and thirty-three minutes in the others, the longest and shortest third stage in the former series being ninety minutes and ten minutes respectively, and in the latter series 120 minutes and ten minutes. Expression caused delivery of the placenta in every case.

CONCLUSIONS.

Our conclusions, as far as may be judged by 100 cases, are:

1. Scopolamine need not be given in larger doses than $\frac{1}{100}$ grain.
2. In the majority of cases it may be given advantageously by the mouth.
3. It is undesirable to keep patients in a darkened room whilst under its influence.
4. The patient should be carefully watched. This can be done equally well by the nurse as by the doctor.
5. No ill effects to mother or child need be expected to follow the rational administration of scopolamine.

6. Whilst its chief indication will be found during the first stage of labour, the fear of rapid delivery following its use is not a contraindication.

In conclusion, we wish to thank the Master, Dr. Hastings Tweedy, for permission to publish our results and also for much advice and help in our investigations and case reports.

CAESAREAN SECTION FOR DYSTOCIA DUE TO VENTRIFIXATION OF THE UTERUS.

By AMAND ROUTH, M.D., F.R.C.P.,
OBSTETRIC PHYSICIAN, CHARING CROSS HOSPITAL, LONDON.

THE very interesting and successful case of Caesarean section for dystocia due to ventrifixation, which was narrated by Dr. Manson Fergusson at page 1970 of the BRITISH MEDICAL JOURNAL for December 24th, 1910, is followed by the statement that he does not know of Caesarean section having been recommended for the condition.

I have recently collected 1,282 cases of Caesarean section by living obstetricians and gynaecologists of the United Kingdom (published in the January number of the *Journal of Obstetrics and Gynaecology of the British Empire*), and amongst these there are seven of these very rare cases. Dr. Fergusson and others will be interested in the details of these seven cases and of an eighth case which occurred in my own practice about a month ago.

CASE I.

Dr. Herbert Spencer's Case (January 13th, 1903).—"Ventrifixation resulting from myomectomy, the pedicle being treated as extra-peritoneal stump." Caesarean section performed before onset of labour. The patient recovered, the child unfortunately dying of haemorrhage from a loose ligature on the funis. Mother not sterilized.

CASE II.

Dr. Targett's Case (February 4th, 1907).—"Ventrifixation in 1902 for retroversion and prolapsus uteri. Patient not in labour when admitted, but fourteen days over full term. At the Caesarean section the fundus was found firmly adherent to the abdominal scar. Child was lying in enormous distension of the posterior wall of the uterus. Mother and child survived. Mother not sterilized.

CASE III.

Dr. Jardine's Case (October 6th, 1908).—"Ventrifixation after last pregnancy. Caesarean section during labour, with threatened rupture of uterus. Fundus found densely adherent above the symphysis. Mother and child recovered. Mother sterilized.

CASE IV.

Dr. Murdoch Cameron's First Case (December 7th, 1908).—"Ventrifixation after fourth confinement. Admitted in labour. Membranes ruptured. Tonic contraction of the uterus. Transverse presentation. Mother and child survived. Mother sterilized.

CASE V.

Dr. Murdoch Cameron's Second Case (November 5th, 1909).—"Three previous children delivered by craniotomy. Cervix could only be reached by passing whole hand into vagina. Mother and child survived. Mother sterilized.

CASE VI.

Dr. Munro Kerr's Case (March 20th, 1910).—"Operated upon during labour. Mother and child survived. Mother sterilized.

CASE VII.

Dr. Ranken Lyle's Case (May 21st, 1910).—"Ventrifixation two years previous. Chronic intestinal obstruction twelve months.

Obstetric History.—Twelve previous pregnancies. Seven abortions before ventrifixation. Eighth and tenth, normal deliveries; ninth and eleventh, "instruments," followed by puerperal fever; twelfth, "instruments" used. In labour but membranes intact. Hand had to be introduced into vagina to reach cervix. Uterus much anteverted, and at the Caesarean section was found to be densely adherent, and the cervix was found to be 4 in. above the sacral prominence. Hydramnios present. Uterus freed and adhesions ligatured off. Abdomen reopened sixth day after operation for intestinal obstruction, but mother died next day. Child also died (hydrocephalus).

CASE VIII.

Dr. Amand Routh's Case (November 25th, 1910).—"The patient had a still-born child (forceps) in 1898, and a living child in 1899. Ventrifixation was performed in 1900, and for three and a half years a sinus remained open in the abdominal scar. Since then she has had three dead children, and has been attended by Dr.

Ernest Higgs, of Oxford, in each confinement. In each case he had the greatest difficulty in delivering the child by forceps, the uterus being firmly adherent to the abdominal wall, and at a high level, and he was only able to reach the cervix by inserting the whole hand in the vagina. The children were very large, 12 to 13 lb. He strongly urged Caesarean section on this occasion, and as the parents keenly desired a living child, I performed Caesarean section at Charing Cross Hospital at the thirty-ninth week. Labour, though not waited for, had evidently commenced. Both mother and child (9 lb. 12 oz.) survived, and are now well. There were extensive adhesions for about 3 in. above the pubes, so I incised the uterus at a higher level than usual, and did not interfere with the adhesions. Mother not sterilized.

These cases show that where ventrifixation causes dystocia, living children can be delivered with small risk to the mother by Caesarean section, and Dr. Fergusson's case shows that Caesarean section may be safely done after other attempts at delivery have been made, provided that (as in his case) antiseptic precautions had been carefully adopted. The only fatal case (No. 7) died of a bowel complication present before the operation.

ABSENCE OF THE FALLOPIAN TUBES AND OF MENSTRUATION, ASSOCIATED WITH RECURRENT PERITONITIS.

(A SECOND CASE.)

By W. G. SPENCER, M.S.,
SURGEON TO WESTMINSTER HOSPITAL.

AT page 926 of the issue of the BRITISH MEDICAL JOURNAL for October 1st, 1910, was published by me an illustrated account of a case in which the Fallopian tubes and menstruation were both absent, but monthly attacks of peritonitis took place. The condition was relieved by an operation, which joined the ovarian pouches with the uterine cavity.

On reading this case, Dr. E. A. Chill of Ealing communicated with me through Mr. Alban Doran, and allowed me to operate on a second case, which has proved altogether similar to that already mentioned. I am, therefore, particularly indebted to Dr. Chill for the opportunity he has afforded me.

Previous History.—The patient, aged 31, married three years, never pregnant, had never had any menstrual flow. No blood nor blood-stained fluid had ever been passed; the only escape from the vagina had been whitish-yellow material, and that never enough to require a diaper. At the age of 14 attacks of pelvic pain began and recurred monthly, lasting three to seven days, during which there might be a very little whitish-yellow discharge, but not always. These attacks have not lasted longer than a week, but have become more and more severe, recurring regularly at intervals of four weeks. The attacks affected the lower half of the abdomen, beginning on one side and spreading to the other, but the pain has always been worst on the left side. She had been under treatment privately and at two hospitals without benefit.

Subjective Symptoms.—On June 7th a very severe attack of pain began on the right side, then spread across the pelvis to the left side and down the front of the left thigh. Pain of less severity was also felt about the umbilicus and round to the back. This was accompanied by headache, vomiting, and sweating. Opium diminished the pain. On October 5th the attack of pain came on so severely that she said she thought she would go out of her mind. Owing to the vomiting neither food nor drugs could be retained, but morphine suppositories lessened the pain.

Admission to Hospital.—She was admitted to Westminster Hospital on October 12th, and continued to have some pain until the 13th. When I examined her on this day there was tenderness to palpation in both the iliac regions, with some rigidity over the lower abdomen. On vaginal examination a tender swelling could be felt on each side behind and external to the uterus. On the 15th all tenderness and rigidity had disappeared, and Mr. Doran did not feel any tender swelling on vaginal examination.

The woman was weak and thin, with a haggard look, beyond this everything appeared normal—the breasts, pubic hair, external genitals, vagina, and uterus.

Operation.—On October 18th I operated, Mr. Doran and Dr. Chill being present. A median hypogastric incision was made, and the omentum found adherent over the pelvis, especially to the abdominal wall. This was freed and turned back. Then the small intestines were pushed upwards without any adhesions being noted, and the uterus was drawn up by means of a volsella. The uterus appeared quite normal; the right tube had a normal junction with the uterus, but at 2 cm. from the uterus it ended conically in the upper edge of the broad ligament. The left tube was also normal at its junction with the uterus, but ended conically 1 cm. from it. Both ovaries were