move freely and play with toys. We also endorse Fairbank's objection to enucleation.

REFERENCES.

¹*Edin. Med. Jour.*, March, 1902. ²*Lancet*, June 20th, 1903.

A SUGGESTION FOR THE TREATMENT OF PUERPERAL CONVULSIONS BY SPINAL SUBARACHNOID PUNCTURE.

WITH NOTES OF A CASE SO TREATED.

By T. ARTHUR HELME, M.D., M.R.C.P.LOND., F.R.S.E.,
Honorary Surgeon for Women, Northern Hospital for Women and Children, Manchester.

OUR knowledge of the etiology and pathology of eclampsia of pregnancy and the puerperium is so unsatisfactory as to afford no rational basis for treatment. In the present state of affairs we must turn to clinical study and to the results of personal experience for guidance. No apology is needed, I think, for venturing to suggest any means of treatment which offers the possibility of relief in this distressing condition.

Whether of mechanical or chemical origin, it is now agreed that the phenomena of eclampsia are largely dependent upon the presence of toxic material in the blood, discussion still going on as to whether this accumulation is the result of deficient elimination, imperfect metabolism, or increased production, or of the introduction of some new toxin foreign to the non-pregnant state. The nature of the toxin is still unknown, nor is there more certainty as to the way in which it produces the eclamptic state.

In the matter of treatment it is agreed that there are three chief indications:

1. To prevent the accumulation and assist the elimination or destruction of the poison.
2. To deal with the pregnancy.
3. To control the convulsions.

And upon each of these there exists a diversity of opinion as bewildering as in the question of causation.

The first indication is scientifically the important one, but at present our methods are purely empirical. It is, however, to the last of these three principles that I wish especially to draw attention; but I may say that my experience coincides with what I believe to be the experience of others—namely, those cases have in my hands done best where the pregnancy has come to an end and the convulsions have been controlled; the worst cases have been those in which the convulsions could not be controlled, and where coma supervened; and I have come to regard the extent to which the nervous system is involved and the success with which this can be controlled as the key to prognosis.

The questions of the management of the pregnancy and of the toxæmia must be dealt with equally, whether we see the case before the occurrence of convulsions or afterwards.

1. *In the Pre-eclamptic Stage* (that is, the stage in which the albumen in the urine may be increasing, while the urea is diminishing in amount, and certain signs and symptoms are appearing, as, for example, headache, oedema, respiratory distress). The first indication is to combat the accumulation of the toxin by dietetic and hygienic measures, attention to the excretions, and possibly the administration of thyroid extract, based on the theory that, owing to thyroid deficiency, tissue metabolism is imperfect. In many cases treatment on these lines succeeds, and pregnancy may run to term; but the anxious cases are those in which the deficiency of urea excretion and albuminuria persist and untoward symptoms intensify; in these cases we have to face the important question of interfering with the pregnancy. If, on the one hand, it is the fact that there is deficient excretion or increased production of effete material directly dependent upon the pregnant state (that is, upon the fact that the maternal organism cannot meet the strain put upon her metabolic processes by the life and growth of the fetus and their consequences), and by appropriate means we are unable to restore the balance, we must consider termination of the pregnancy as an important and integral part of treatment; or if the toxin is some special toxin generated in the gravid womb from placental or fetal faultiness, or some toxin formed in association with the dissolution of deported placental cells (escaped into the maternal blood stream), the same rule holds, though possibly we must eventually rather look to serumtherapy or treatment by antitoxin injections. If, on the other hand, it could be shown that the fault lies in some distant organ,

for example, the thyroid gland, and a remedy can be found by supplying some deficient element of its secretion, a great point would be gained, for interference with pregnancy would become unnecessary. If it should become necessary to terminate the pregnancy, the choice of method is of importance. Formerly I have induced labour by the introduction of bougies and also by the glycerine method of Pelzer, but recently I have employed the more rapid method of dilating by Bossi's dilator. The first and second principles of treatment are bound up together and are of special importance in the preventive treatment of eclampsia, but, once convulsions have set in, the third principle becomes of instant and of first importance.

2. *Eclamptic Stage*.—The first principle of treatment remains in force: it is necessary to get rid of the toxin, and now more active measures must be taken: hot packs, saline injections, and rectal irrigation are of use. With regard to the second principle—the management of pregnancy—there is a great diversity of opinion. Looking upon the continuance of pregnancy as a vital factor in the production of the poison and the causation of this disease, my own practice is to end the pregnancy, whether labour has commenced or not. Truly, the onset and progress of labour by the unaided natural powers, involving much unwonted muscular work and nervous strain, must throw into the system an additional amount of effete material, with which the excretory organs, if already damaged, may be unable efficiently to cope, or the violent uterine contractions may conceivably give rise to further escape of placental cells into the maternal blood-stream, and so intensify the danger. And it is on this account that I personally am of opinion that the right course is not to leave the matter in the hands of the maternal powers, but to terminate the labour as expeditiously and as safely as possible by artificial means. Though much has been said, and possibly rightly said, in favour of abdominal or vaginal Caesarean section, my own practice is as follows:—(1) Where labour has commenced and the os is dilating I chloroform and deliver, if necessary, completing dilatation artificially by hand or instrument. (2) Where labour has commenced and the os is not dilating, or where labour has not commenced, I chloroform and dilate by means of Bossi's dilator and deliver. Formerly I dilated manually, or by hydrostatic bags, but now I prefer Bossi's instrument, which I believe, if carefully used, may be safely used. Possibly the fact that my muscular development is not too great has preserved me from inflicting those serious injuries which apparently have been met with in its use. If dilatation be performed slowly and the cervix carefully watched there should be little danger. But, as I said before, when once convulsions have occurred, whether before, during, or after labour, the third principle becomes of instant importance. It is now essential to control the convulsions, and this is the special point to which I desire to call attention.

The Convulsions.—How are the convulsions caused? Several suggestions have been offered: (1) That they are produced by direct action of the toxin upon the nerve cells, (2) by cerebral anemia, the result of constriction of arterioles, (3) by cerebral oedema, the result of increased arterial tension, (4) by coagulation and capillary thrombosis. A suggestion, which I now advance, is that the eclampsia is due to increased cerebro-spinal tension. If we look at the clinical aspect of a case, we see at once that this suggests intracranial pressure. The premonitory signs of headache, dizziness, irritability and sudden blindness, the clonic, tonic, and tetanic spasm, the stupor and coma, all are consistent with increased intracranial pressure. Whether this be the cause or not, the continuance of the violent convulsions will increase the pressure by causing congestion of the cerebral vessels, and if continued, serous effusion and even hæmorrhages may occur. We have only to think of the picture of the eclamptic woman to see how grave must be the congestion resulting from each attack. If this intracranial pressure be present, and if it be allowed to continue unrelieved, or to increase, it will in all probability lead to death. If the convulsions continue unrelieved, small or large hæmorrhages or other vascular disturbances may occur, and, once this state is reached, the patient will almost inevitably die—these are the cases that end in death, whatever treatment be adopted, and my experience has led me to the conclusion that the tendency to death is proportionate to the extent to which the nervous system is involved. Whilst therefore dealing with the questions of the toxæmia and the pregnancy, it is essential to control the fits.

What Means Have We?—Up to the present time we have

been dependent chiefly upon drugs. It has lately been suggested that saline injections may be of use by washing out minute capillary thrombi—an unsatisfactory theory. Venesection, too, has been thought to influence the fits by reducing arterial tension; but it is chiefly upon drugs that we depend. I must confess to employing drugs, especially morphine, with a feeling of anxious doubt. We have yet no rational basis for their use; we are acting altogether in the dark, and are introducing into the body, once and for all, substances which, whilst they may do good, offer for all we know an equal chance of doing harm. Most of the drugs are cardiac depressants, and their actions require to be carefully watched. Morphine, if given in sufficiently large amount, whilst certainly paralyzing the nerve centres, with equal certainty interferes with and checks metabolism and arrests the excretions—the interference with the latter being the antithesis of what we want. To illustrate the difficulty of the present position it is only necessary to refer to the fact that whilst one school recommends morphine to control the fits and inhibit metabolism, another would exhibit thyroid extract because it enhances tissue change. If it could be shown, on the one hand, that the toxæmia is *not* due to the accumulation of effete materials usually present in the body, which are now in excess and capable of being eliminated by the natural channels, if these could be got to work, and, on the other hand, that the toxæmia is due to the presence of some new toxin entirely peculiar to the pregnant state, for example, a toxin formed during the process of dissolution of placental cells (syncytiolysin or syncytiotoxin), and that this toxin chiefly acts as a poison to the nervous centres; then, until the discovery of a specific antitoxin, there might be ground to encourage us to push the administration of morphine, even though it blocked the excretions. Recent experimental researches have been conducted in this direction. It has been shown by Schmoll and others that during pregnancy fragments of villi or syncytial cells escape into the maternal blood stream, and upon this fact has been built the following theory: These foreign cells act as a poison to the maternal system; they give off a toxin (cytotoxin), for the neutralization of which an antitoxin (cytolysin), which has the power of destroying these cells, is produced by the maternal tissues. Veit suggested that, if this antitoxin, which he named syncytiolysin, is formed in insufficient quantity, the placental cells are not destroyed and act as the direct cause of the eclampsia. Ascoli, as the result of experiments, concluded that the convulsions were due to over-production of this syncytiolysin, whilst Weichardt propounds the theory that in the dissolution of the placental cells by the maternal antitoxin (syncytiolysin) a new toxin is set free, which, if not neutralized, will give rise to eclampsia, and this he calls syncytiotoxin. His conclusions are the result of experiments upon rabbits and guinea-pigs, in which he has induced all the phenomena of eclampsia. Recently these experiments have been repeated by Wormser, of Bale, who has failed to confirm the results obtained by Weichardt. Unfortunately, then, this interesting and promising theory remains a theory: we have no substantial evidence of the existence of this specific toxin and our hopes of a specific antitoxin are unrealized. We must return, therefore, to our present means of controlling the convulsions, for which, as I have said, we are chiefly dependent upon drugs.

It would be of inestimable value if we had some means whereby we could control the fits without introducing into the system new substances or drugs, which may do harm—some means to control the fits with certainty, averting, as it were, the immediate menace of death, and allowing time to bring the pregnancy to an end and to get the excretory powers to work.

If my view that the convulsions and stupor are dependent upon an increased intracranial pressure be correct, we have a most satisfactory and certain means of obtaining immediate relief. In 1872 Quincke noted the free communication of the subarachnoid spaces of the brain and spinal cord, and again in 1891 he called attention to this fact and to the possibility of tapping the spinal cord in the lumbar region. Since that time many cases have been recorded, chiefly of meningitis in children, but also some cases of persistent headache and coma in lead poisoning and chronic Bright's disease, in which the method has been employed and relief has been obtained. It was in November of last year that I decided to apply this method of treatment to puerperal eclampsia.

The first two cases seen by me after coming to this decision

I now record for the sake of contrast; in one the method was not employed, in the other it was; both were cases of pure puerperal eclampsia, the convulsions following confinement. The question of treatment was simplified, for the first principle—the management of pregnancy—was not involved, the pregnancy having already come to an end before the fits appeared. Treatment, then, lay in the direction of controlling the convulsions and eliminating the poison; it was a matter of energetic action.

The first case was that of a primipara, over 30 years of age, the wife of a member of the medical profession; during pregnancy her health was good; a fortnight before confinement, noticing that her ankles were a little swelled, she called her husband's attention to the fact; he thought little of it, but examined the urine, which contained no albumen.

Labour was quite straightforward, but, as the perineum was somewhat resistant, chloroform was administered and low forceps applied. Everything appeared satisfactory, the only noticeable feature, to which no great importance was at the time attached, being that the patient was somewhat excited and lively. Delivery took place about 10.30 p.m.; during the night the doctor was summoned because of some slight attack, the nature of which was not quite evident; this occurred two or three times. No urine was obtained.

In the morning the patient had a more definite eclamptic attack, and I was sent for. On my arrival I witnessed a most violent and prolonged eclamptic seizure: by catheter I obtained a very small amount of urine (a few drachms) which was deeply mixed with blood. Chloroform was administered and a pint of saline solution injected beneath each breast; chloral and croton oil were given by mouth and hot saline solution injected into the bowel. The question of lumbar puncture was mentioned, but, owing to its experimental nature and the surroundings of the case, was not employed. I remained with the patient for several hours, during which there were several convulsions. Then as the patient appeared to have settled down into a quiet sleep, I left her, requesting that I should be sent for if necessity arose. The patient, however, as I subsequently was grieved to learn, died about twelve hours after the first violent attack.

The second case was one which I saw in consultation with Dr. Henry and Dr. McMaster, of Rochdale, on December 19th, 1903, and to the latter I am indebted for the notes of the case:

The patient was aged 29; morning sickness had persisted all through pregnancy, and from the sixth month onward the patient had suffered from headache and swelling of the ankles, the urine being scanty. Labour was natural, lasting only a few hours and a midwife being in charge; the child was born at 6 a.m., and the patient was then quite comfortable, but, two hours later, she complained of headache, vomited, had a fit, and suddenly lost her sight, the blindness being complete. During the day the fits recurred with increasing severity and frequency. At first, during the intervals, the patient was irritable, but the irritability gradually gave way to stupor; the stupor deepened until, towards 5 p.m., when I first saw her, the patient was almost comatose between the fits. In ten hours there were fifteen fits, and as the day advanced the patient was progressively becoming worse.

Treatment.—During the day chloral hydrate and a diaphoretic mixture were given by Dr. Henry and Dr. McMaster. At 3 p.m. Dr. Henry telephoned to me, and on my suggestion the chloral was repeated, 5 gr. of thyroid extract and 2 minims of croton oil were administered, and normal saline solution was injected into the rectum. At 5 p.m. I met Dr. Henry and Dr. McMaster in consultation. The patient was very ill; her condition had steadily got worse in spite of the treatment employed; the fits were very violent and prolonged, and in the interval the patient maintained a semi-comatose state; it looked as if she must die. We decided upon energetic action. The patient was put under chloroform by Dr. McMaster, and a pint of warm saline solution (made up from Burroughs and Wellcome's tabloids—a most convenient preparation) was transfused beneath each breast: whilst Dr. Henry attended to this, I performed spinal subarachnoid puncture in the lumbar region and withdrew a drachm and a-half of cerebro-spinal fluid. The fluid escaped rapidly, as if under considerable pressure, and not drop by drop, as occurs, for example, in health when the needle is inserted for cocaine anaesthesia. A rectal injection of hot saline solution was also given. We stayed with the patient till 7.30 p.m., and as no further convulsion occurred and as the patient was perfectly quiet, she was left in charge of the midwife. At 10 p.m. we again visited the patient, and were informed by the midwife that the patient had had "two very slight fits" during our absence. The patient was, however, in a very satisfactory state; she spoke to us, recognized the voices of the doctor and her friends, and sat up in bed to drink some water and take the medicine given to her; there was, however, still total blindness. From this time onwards there were no more fits, the patient steadily improved, and is now quite well, and has completely recovered her sight; the albumen disappeared from the urine six weeks after labour. For four days the extract of thyroid (5 gr. three times a day) was continued, large doses of acetate of potash were given at frequent intervals, with plenty of barley water to drink, and the bowels regulated by sulphate of magnesia for a week. Thereafter she was given a mixture of liquor ferri perchloridi, acetate of potash, and aq. chloroformi.

The method of operating employed was as follows: The patient was placed upon her left side, and the trunk flexed as far as possible; the skin of the lumbar spinal region was washed with ethereal soap and water, and then with per-

chloride of mercury solution (1 in 2,000). The highest points of the iliac crests being determined, an imaginary transverse line was drawn between these points; the left index finger was placed upon the point where this imaginary line crossed the spine, this point coinciding with the tip of the spinous process of one of the lumbar vertebrae. A hollow needle, $3\frac{1}{2}$ in. long, held in the right hand, was made to pierce the skin $\frac{1}{2}$ in. to the right of the point held by the operator's left index finger, and was then pushed onwards, being directed slightly upwards and towards the middle line, so as to pass beneath the lower edge of the vertebral lamina, and so enter the subarachnoid space.

Such is the history of these two cases, and the successful issue of the second case, which seemed quite hopeless, gives me a feeling of the deepest regret that lumbar puncture was not performed in the first.

I have only one case to record, and on that account I have hesitated to bring this matter forward. The importance of the subject, the peculiarly distressing nature of the occurrence, the absence of definite knowledge, and the feeling of uncertainty and semi-hopelessness in our present treatment, together with the hope that this suggested method may receive extended trial and prove of value, must be my excuse, if apology be required, for bringing the matter forward at this stage.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

THE PREVENTION OF BUBONIC PLAGUE.

MAY 1, as one who has had a certain amount of experience of bubonic plague in China and South Africa, throw out a suggestion not for the cure but for the prevention of this terrible scourge? Let me first, however, draw attention to certain characteristic features of this disease.

1. Given similar conditions and environment, the "coloured" and "white" races are equally susceptible.
2. The former races are attacked in overwhelming proportions to the latter owing to differences of condition and environment, the most important of which is that "coloured" people are almost invariably barefooted.
3. Plague is caused by the admission into the system of a specific micro-organism or its spore.
4. The means of entrance is most frequently (always?) by a solution of continuity of the skin or mucous membrane.
5. This is usually situated in the foot amongst non-Europeans.
6. The groin is the usual site of the bubo in such races.
7. Provided the manipulator has no abrasion about his person, cases of bubonic plague may be handled with perfect impunity.
8. In the comparatively rare instances in which "whites" contract the malady, the bubo exhibits a predilection for the axillary or pectoral regions. In descriptions of the "black plague" of London the pectoral bubo is vividly portrayed.

Taking the above points into consideration, why not compel all "coloured" people resident within or in the immediate neighbourhood of plague-infected areas to wear an adequate protective covering to their feet?

This suggestion is at any rate well worth a trial, and I feel confident that, were it enforced, a marked diminution in the bubonic plague-rate would ensue.

C. MARSH-BRADNELL,
Staff Surgeon, R.N.

Llanidloes.

SEPTATE VAGINA.

THE notes on septate vagina in a recent number of the BRITISH MEDICAL JOURNAL were interesting to me because of a case I met with three years ago. S. A., a maiden lady, aged 50, consulted me for obstinate constipation accompanied by abdominal pain, and in the course of a pelvic examination the following notes were made.

Per Vaginam.—The external genitals are normally formed; hymen present, though small; the finger can be introduced into the vaginal canal only a little over an inch; there the continuity of the canal is interrupted by a thin strong septum transversely placed, the centre of which is perforated by a small opening sufficient to allow an ordinary uterine sound to pass easily through.

Bimanual Examination per Rectum.—The uterus can be felt situated normally in pelvis, and is normal in size. On passing the uterine sound

through the aperture in the vaginal septum with the finger at the same time in the rectum, the point of the sound can be felt free in the upper portion of the vaginal canal.

There was no history or sign of any inflammatory trouble that might produce cicatricial atresia, and the condition gave rise to no specific symptoms, its discovery being quite accidental.

Matlock.

GEORGE C. R. HARBINSON, M.B., B.Ch.

THE ETIOLOGY OF VARICOCELE.

I HAVE a case of ordinary varicocele (left) said to have been caused by a strain. The lad (aged 17) was lifting a heavy trough with his hands behind him, and he says he felt a sudden pain in the left groin and found his scrotum swollen. On examination I found a varicocele, and in addition swelling and discoloration around the ring. The lad denies having ever indulged in masturbation, and persists in his first declaration that there was no swelling of any kind before the accident.

Some recent authorities admit that a severe strain is one of the possible causes of varicocele, and it seems reasonable that any severe intra-abdominal pressure might cause sufficient dilatation of the spermatic veins to overstrain their coats. The interesting question however arises: On which side would such a varicocele appear? The arrangement of the left vein at once explains why the dilatation appears on that side in ordinary cases, that is, there is obstruction to the upward flow in the surcharged vessel. But intra-abdominal check to the upward flow in the cava would surely cause distension on the side where least resistance exists, that is, on the right, where the spermatic vein joins the cava obliquely.

My point is that the fact of the varicocele being on the left negatives the contention that it was caused by the strain, and that the surrounding swelling and discoloration were caused by the crushing of a pre-existing varicocele against the lad's hard stiff trousers.

Barnsley.

JNO. MACPHAIL, M.B., C.M.

REDUCTION OF DISLOCATION IMMEDIATELY AFTER THE ACCIDENT.

IN reference to Dr. Walford's communication under the above heading in the BRITISH MEDICAL JOURNAL of March 19th, p. 664, I might be allowed to mention an accident which occurred in my own person some eight years ago, and due to a similar cause. I was riding a bicycle when I suddenly came upon a piece of sharp new road metal, and, jumping off rather awkwardly to save my tires, I fell with all my weight upon my extended thumb on the elevated edge of the metal before the rest of my hand reached the ordinary level of the road, the result being that my thumb was dislocated at right angles to its ordinary position, the base projecting down into the palm. With my left fist I at once hit the base a smart blow upwards and outwards, instantly restoring it to its normal position, and, seizing it, flexed it strongly into the palm, retaining it there with my handkerchief as a bandage; and as in Dr. Ward's case, this was all done without almost the slightest pain. The thumb remained swollen and stiff, and painful for two or three weeks, but I thereafter quite regained the use of it.

Sunderland.

B. STRACHAN, M.B.

STERILIZATION OF THE HANDS.

PROBABLY many surgeons who, like myself, possess a pretty sensitive skin have found many of the ordinary means of "sterilizing" one's hands before operating quite impracticable. The following has been arrived at after various experiments, and as it seems to keep one's hands in excellent condition even with operating six days a week it may be worth recording.

1. After paring the nails with a nail trimmer, they are carefully cleaned and the hands and arms scrubbed with a broad, fairly stiff nail brush, abundant hot water and soft soap, for ten minutes by the clock. The nail brushes are boiled daily for thirty minutes and kept in 1 in 2,000 corrosive sublimate lotion.

2. The nails are again thoroughly cleaned with bone or metal nail cleaner. Much material formerly irremovable is now softened and easily taken away. The hands and arms are again scrubbed as before, for five minutes. Then after rinsing in boiled water they are (3) scrubbed thoroughly with 1 in 500 corrosive sublimate lotion made with half alcohol and half water. This scrubbing is to take ten minutes. After this they are rinsed in 1 in 2,000 corrosive lotion, then in sterile

1 All non-Europeans are included in the word "coloured" people.