their families, without being a burden to them. The opportunities for the study of the disease will be greatly enhanced, and the need for the discovery of better methods of treatment than the present will be better advertised. There will develop quite a definite body of nurses who have been trained in tuberculosis. A saner view will be held about the dangers of contracting the disease by contact, and nurses will not shun the work. The rich who do not wish to send their tuberculous relatives from their homes will be enabled to secure the help of these nurses for home treatment. The scheme would make no attack upon the present plan of providing sanatoriums for the poor, or for the rich. Lastly, though I admit it is a large undertaking, the provision of Invalid Homes for the permanent maintenance and nursing of tuberculous subjects who are incurable, may in course of time become extended most beneficially, so that Invalid Homes will be provided for the permanent reception of those who are incurable of other diseases which render the patient a complete invalid and a burden to his family. To the cry "decent homes for the poor" must be added "decent permanent hospital accommodation for those who are laid aside by pulmonary tuberculosis or any other disease which has reached an incurable stage."

ECLAMPSIA: ITS PREVENTION AND TREATMENT.

BY

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ECLAMPSIA, in my opinion, is a preventable disease, and one which in a few years, like many others equally fatal, might be made entirely to disappear. To show how this may be done is the main object of this article. In the meantime I believe that a great many of the lives which are now lost by the wait and see method of treatment might almost all be saved by a policy of prompt action. What this action should be is the second object of this paper. Most of what I am about to say is generally well known to specialists in this department of our art, but unless the views I am about to express are generally adopted and carried out by the rank and file of the profession who are engaged in general practice, and who are the first to see the patients, things will still go on in the way they are going. During the last three years 1,052 mothers in the British Isles have lost their lives from this cause, and approximately 600 children. The Registrars-General of England and Wales and of Scotland and Ireland have kindly furnished me with the following figures for the last three years available.

Deaths from Eclampsia (Three Years).			
England and Wales	...	...	545
Scotland	...	...	311
Ireland	...	...	196
Total	...	...	1,052

There are no figures for the children, but 60 per cent. is a low average, and even that gives the 600 above mentioned; it is probably a great deal more. This is only for the British Isles. If we take the population of the empire as approximately ten times the population of these isles, we would have the death of 10,000 mothers in the last three years and at least 6,000 children. This number of lives of mothers and children is well worth saving. Owing to the partial acceptance of the views which I am about to advance, which have been adopted by many professors of midwifery, there has been a decrease of about 14 per cent. in the deaths from this cause in the last three years. In the first of the three years given me by the Registrars-General there were 374 deaths, while in the last of the three years the total deaths in these isles of mothers were 323, or about 14 per cent. less. This decrease is very gratifying and goes to show that the general adoption of prompt action following early diagnosis might do away with the death-rate altogether.

This improvement in the treatment of eclampsia is going on in other countries, as is proved by recent statistics of one of the largest maternity hospitals in the

world, the Sloane Hospital of New York. The director, Dr. Cragin, says that among 35,774 confinements in the last twenty years there were 389 cases of eclampsia. In the first series of 20,000 deliveries there were 231 cases of eclampsia with 28 per cent. of maternal deaths and 60 per cent. of fetal deaths. In the second series of 15,774 deliveries there were 138 cases of eclampsia, with 14 per cent. of maternal deaths and 44 per cent. of fetal deaths.

The first marked improvement took place when ether was substituted for chloroform. This is explained by the fact that prolonged chloroformization over many hours, as used to be the custom in convulsions, was very injurious to the liver, while at the same time the eclamptic condition had already seriously disturbed the functions of that organ.

The next great lessening of the death rate took place when it became generally recognized that once an eclamptic convulsion occurred the sooner the uterus was emptied the better. But it soon became evident that there was a great difference in the death rate depending on how much shock there was accompanying the speedy delivery. In other words, there was a much lower death rate when the speedy emptying of the uterus was accomplished by gentle means instead of by *accouchement forcé*, with its rapid dilatation of an undilated cervix, necessitating tears or incisions of the cervix and lacerations of the soft parts of the birth canal caused by rapid extraction, all of which led to shock.

Thus at the Sloane Hospital during the first period, when there was a death rate of 28 per cent. in 231 cases of eclampsia, the treatment had been by rapid dilatation and rapid extraction, or what is now known as *accouchement forcé*. In the second period, with 138 cases, the maternal death rate diminished exactly one half, to 14 per cent., while the child death rate fell from 60 to 40 per cent. In this second series delivery was also accomplished as quickly as possible, but by gentle means, and while these were being carried out everything was being done to lessen the toxæmia by favouring excretion and to diminish shock by quieting the nervous system.

I believe that by the general adoption by doctors and midwives of a few simple precautions the number of cases of toxæmia might be very greatly reduced and almost prevented altogether. My paper will be divided into two parts—prevention and treatment.

Prevention.

As the success of the preventive measures depends entirely upon their early application, how can we detect the cases which are going to be eclamptic ones in time to head the convulsive stage off, so to speak, and carry the woman on to full time without ever allowing sufficient of the toxic material to accumulate in her blood to cause an eclamptic explosion? The means of making an early diagnosis is well known—namely, to make an examination of the urine at the end of the sixth, seventh, eighth, and ninth months. If no albumin is present at any of these examinations, there is not one chance in a thousand that the woman will have puerperal convulsions. I therefore believe that the presence or absence of albumin is such a sure test that if it were carried out by every one of the thirty-five thousand doctors in practice in these isles, and if all the midwives and nurses would instruct all the women whom they were engaged to attend as to the importance of going to a doctor for examination of the urine three, two, and one months before delivery was due, practically every case would be detected in time to be treated so that convulsions would be prevented. A great many good doctors whom I have interviewed on this point have said that they had all been taught to take this precaution, but that they seldom or never took it because many of the women were not seen by them until they were called to attend them in labour or in convulsions, when, of course, it was too late to prevent the disaster. As for the woman who had engaged a midwife, the latter, it would seem, rarely if ever mentioned the subject of an examination of the urine. A general crusade carried on by thirty-five thousand doctors as well as by the highly intelligent midwives under the control of the Central Midwives Board would soon result in the mothers of the future realizing that a safe delivery is not a matter which should be left to chance, but that every precaution should be taken to place themselves under the care of a good doctor or midwife not later than the beginning of the sixth month, so

that the condition of the kidneys should be ascertained. The prenatal clinics, which are doing such good work in different parts of the country, would no doubt take this work in hand if they have not already done so. We who have the health of the nation in our charge should not rest satisfied until every woman has been trained to bring a sample of her water to her doctor not later than the end of the fifth month. This process of education should not be restricted to those married women who are actually five months pregnant, but every married woman of child-bearing age should have a minute or two spent on her in telling her that if ever she becomes pregnant, either at home or abroad, she should take this very important precaution.

Now supposing that a woman should come to us at the beginning of the sixth month or earlier or later with a small quantity of albumin in her urine, what must we do to save her from the risk of eclampsia? Supposing that this is her first pregnancy and the first time she has ever had any sign of albuminuria, it is evident that something has happened to her kidneys by reason of her pregnancy. What has happened? Some think that a toxin, normal or abnormal in character but in greater quantity than before pregnancy, has injured the tubules of the kidneys. Others think that the presence of the child and the gradually increasing bulk of the uterus is obstructing the return of venous blood from the kidneys to such an extent as to cause congestion and the beginning of inflammation or Bright's disease. It is difficult to say which are right. The mother *plus* the child might be expected to produce more of the toxins which are normally excreted by the maternal kidneys than would be produced by the mother alone. I am inclined to the view that the presence of the child and the distended uterus pressing on the large veins is the first cause, for the reason that it is the experience of all observers that the disease begins to get better almost from the moment that the uterus is emptied and the pressure on the abdominal contents is removed. Another argument in favour of the pressure theory is that eclampsia is not only more common with the first pregnancy but very much more common still when that first pregnancy is a twin one. The rigidity of the ever stretching abdomen in a primipara would quite explain that.

As we would not be justified in resorting to the emptying of the uterus in an early case, we must at least double or quadruple our vigilance. An examination of the urine every week would be a wise precaution. The next point which has been well established is that the amount of albumin in the urine can be greatly reduced, as well as the quantity of toxins, by a certain diet, while they are both increased by certain other articles of food. Still another point has come to be generally recognized—namely, that the toxin is either urea or one of the products of nitrogen. Abstention from fish, flesh, and fowl is at once followed by a marked decrease in albuminuria. One of my assistants, who is now professor of obstetrics and director of one of the largest maternity hospitals in the world, has practically abolished eclampsia in that district by making it widely known that he will admit pregnant women with albuminuria to the hospital, no matter how early in their pregnancy they may be. He has assured me over and over again that without any medicine, but only by dietetic and other hygienic treatment, he has prevented all of these women from having convulsions.

A great many doctors send such cases to him from a radius of about a hundred miles, and the only conditions are that they will examine the urine for albumin not later than the end of the fifth month, and that they send the women in as soon as albumin is discovered. In order to give the women occupation, as well as for financial reasons, there is a large and thoroughly up-to-date laundry in connexion with the hospital, where hundreds of private families send their washing, so that several favourable conditions are added to the carefully chosen diet. The women are kept warm with their skin acting freely in the coldest weather, and what nitrogen they get in their diet is rendered as harmless as possible by thorough oxidation. The nature of their work induces them to drink large quantities of water or weak tea, by which their kidneys are kept flushed and the poison is washed out. The severe cases are placed on an absolute milk diet until the albumin disappears. For all the others cereals and vegetables and fruit compose the bill of fare.

In private practice, as soon as albumin is detected in a

pregnant woman's urine in a slight amount, we can instruct her to dress warmly and to avoid cold and wet. We can teach her to drink larger quantities of water, and, if she can afford it, to give the preference to alkaline mineral waters such as Vichy, of which she should use not less than a bottle a day. If anaemic, we must give her mild preparations of iron to make up for the cutting down of her allowance of meat, although she may continue with fish as long as the albumin is lessening or absent. As there is generally a condition of acetonuria, or at least a lessening of the alkalinity of the blood, we must give alkalis, a very useful one being the ordinary mist. rhei et sodae suitably flavoured and disguised. It has the advantage of being gently laxative, an important part of the treatment being to see that the intestines do all their own work and help the kidneys a little as well. With regard to exercise, this helps perspiration and should be encouraged either as work in the house or as walking out of doors; preferably the latter when the weather is warm.

Although all will probably agree that it is important to dilute the urine as quickly as possible if it is scanty and concentrated when the patient first comes under our notice, yet it is not always easy to get the patient to drink enough and quickly enough. Some years ago a woman made her first visit to the writer at the end of the fifth month. On boiling a catheter specimen the contents became solid in the test tube, so that the latter could be turned upside down without any running out. The patient was immediately put to bed and given copious draughts of lemonade and other things, the foot of the bed was raised, and she was given a continuous rectal enema of normal salt solution. There was a little increase in secretion of urine, but a few hours after she was first seen a convulsion came on. For this she received a hypodermic of morphine, half a grain. Almost immediately she began to pass water, and a few hours later she was delivered of a small dead fetus of about five months without a second convulsion. After the delivery she was put on large doses of sod. bicarb., and in less than a month the albumin had completely disappeared.

If a woman comes to us with a specimen of her water for the first time at the beginning of the sixth month and we find instead of a trace of albumin a very considerable amount, our activity must be great in proportion to the albumin. She should go to bed and be put on an absolute milk diet. When a patient suffering from albuminuria has been on a milk diet for one week she will almost certainly escape a convulsion. But an absolute milk diet is rarely necessary for the whole period of the remaining months of pregnancy. Sometimes a week or two of milk diet, followed by the other dietetic and hygienic measures will suffice to reduce the quantity of albumin to a comparatively safe amount. By examining a specimen every week one will soon perceive that the condition is improving. In that case we may safely extend the diet to milk foods or cereals with a large proportion of milk. Such, for instance, as purées made by boiling either potatoes, tomatoes, beans, peas, or artichokes until they are soft enough to pass through a colander and then mixed with sufficient hot milk to make it the consistence of cream. When flavoured with salt these purées are appetizing as well as nourishing, and as a full soup plate measures just a pint this is a good way of getting down liquids. Boiled rice and blancmange with fruit or jam are eaten with milk, and this latter supplies phosphates for the baby.

When we are hesitating about interrupting the pregnancy we must keep in mind the danger of injury to the brain. Quite a number of cases of paralysis are on record, and I have seen two myself due to brain lesions during the first convulsion. Some die in a few months, while others drag on a miserable existence, all of which could have been saved by following the rule to empty the uterus quickly.

Treatment.

Certain drugs that have been recommended I will mention only to condemn. At one time it was thought that veratrum viride would benefit every case, and two cases, in which I gave full doses hypodermically until the high tension of the pulse came down, recovered. But veratrum viride, by lowering the arterial tension, may bring about a condition akin to shock, so that the woman is in a bad condition to undergo any surgical procedure. Venesection should be abandoned for the same reason, and also because, though the woman may be congested in

the face during the convulsions she is pale between them, and very often there is general anaemia as well as anaemia of the brain. Chloral hydrate has been responsible for more deaths than is generally supposed, and chloroform I would forbid, being heartily in accord with the Mayos, who never allow it in their clinic. Ether lessens shock. There is no objection to bromides either by the mouth or rectum, but they are not curative, since they merely quiet the nervous system without removing the cause of the convulsions.

There are other procedures, however, which cannot be too highly recommended; and the first of these is a hypodermic of morphine. I have generally given just the one injection, the dose being one-half grain with one-hundredth of atropine. I cannot recollect a case in which a convulsion occurred after this had time to take effect. Many writers have objected to the use of morphine on the ground that it is likely to stop the secretion of urine. This may be true in normal conditions, but it is quite different in the condition of eclampsia. Here the secretions are already stopped, because there is a poison in the blood which has set up such a spasm in the arterioles, that the blood cannot get into the kidneys to be purified. Neither can it get into the arterioles of the brain, so that portions of it at least are anaemic, as in chorea. A full hypodermic dose of morphine will not only arrest the convulsions, but it will be almost immediately followed by the secretion of urine in comparatively large quantities.

If there is not enough water in the blood to flush out the kidneys we must promptly supply it by the mouth if the patient is conscious; otherwise, by the rectum. This may best be done by the slow continuous method, which consists in raising the foot of the bed on two kitchen chairs, each foot resting in the centre of a chair, and then laying a rubber fountain syringe on the foot of the mattress, so that the reservoir is only a few inches higher than the rectum. This part of the bowel is capable of absorbing enormous quantities of normal salt solution, on the one condition that it enters slowly and under low pressure. If administered from a reservoir a few feet high the rectum will rebel and expel it. While in charge of a hospital in France I made frequent use of this method with the most gratifying results, and for many years before that I have employed it to prevent shock during and after severe abdominal operations. I cannot too strongly emphasize these two points. In every case since I have given morphine and administered water by the rectum the albumin has promptly disappeared from the urine, the colour and quantity of which has quickly improved. The water goes in clear and comes out loaded.

If after having done these things a convulsion comes on, all are agreed that there must be no further delay. The child must be delivered as quickly as possible with the smallest possible amount of trauma and shock. The dilatation of the cervix with Bossi's dilator, or any other procedure included under the term of *accouchement forcé*, must be discarded. If the os is dilatable, an attempt may be made gently to dilate it with the hand, but on the one condition of absolute asepsis, as though it were an abdominal operation, which may, indeed, become necessary a few minutes later; the success of the operation of Caesarean section depends on the uterus being aseptic. Rubber gloves must be used. If the child cannot be delivered with forceps in a few minutes, without tearing the cervix and without violent efforts, it is far better not to continue the attempt. We have another means of terminating the pregnancy which is unaccompanied by shock. Some think that if the child is dead or will die soon after birth, as many infants of eclamptic mothers do, we should break up the child by craniotomy, whether living or dead. I totally disagree. There are others who have advocated vaginal hysterotomy, which consists in cutting through the undilated cervix and delivering with forceps. But this means extensive tearing and bruising and much shock, and for this reason I am opposed to it. If the child cannot be delivered quickly, aseptically, and without injury to the uterus and soft parts, it is better to abandon the vaginal route altogether and at once, and resort to that method of delivery in which shock and sepsis and mortality for the mother are reduced almost to the vanishing point, the average for good operators being about 3 per cent., although there has been at least one run of a hundred cases without a death. This method is Caesarean section by the abdomen. At the same time by this

method the chances for the child's life are very greatly increased, for its journey from the womb to independent life occupies only a few seconds, and absolutely without the hardships of the natural process. With an ever-increasing number of teachers, I maintain that in a certain class of cases it is the only thing to do, and it should be done promptly before any vaginal manipulation. If the eclamptic woman is a primipara, or if she has a long rigid cervix, if the child is viable, if she is near term, in such cases delivery by the vagina owing to the trauma of dilatation, coupled with the shock of the long tedious labour and the risk of infection to which eclamptic patients are especially liable, is much more dangerous than Caesarean section.

Summary.

I may sum up as follows:

1. Do not fail to prevent eclampsia.
2. Do not fail to examine the urine at least four times at the end of each of the last four months, and if albumin is present put the patient on a milk or vegetable diet; give sodium bicarbonate and laxatives, and keep the patient warm, in bed if necessary.
3. If a convulsion occur, do not give chloral or chloroform, or veratrum viride, nor employ venesection.
4. Do not allow the pregnancy to continue when it is known that brain and kidneys are being irreparably damaged.
5. Do not forget that *accouchement forcé*, vaginal Caesarean section, and craniotomy, in the interests of the mother as well as of the child, are no longer justifiable.
6. Do not forget that abdominal Caesarean section performed by an experienced operator is one of the safest operations in surgery for the mother, and that it enormously increases the chances for the child if performed after the end of the seventh month when the child is viable. In one of the latest works on obstetrics D. Lees says that a well known operator had reported 550 cases of eclampsia operated on within one hour of the first convulsion without a single death.
7. Do not forget that the best time to operate is before labour begins and before the woman has been examined by an ungloved hand. The few deaths which now occur are due to infections of the uterus.
8. Do not look upon eclampsia as a one man case. There must be three doctors and a good trained nurse if every case is to be saved. If the proper conditions cannot be obtained at her home, it is better to send her to a good obstetric surgeon at a good hospital.

DENTAL CONDITIONS AT AN ANTE-NATAL CLINIC.

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HAVING had my attention arrested many times by the bad state of the teeth of the patients coming to the ante-natal clinic in the Edinburgh Royal Maternity Hospital, I decided to make a systematic examination of the next hundred cases beginning on June 3rd, 1919. Nine meetings of the clinic served to supply more than one hundred cases of expectant motherhood, and the special inquiry into the teeth was closed on July 1st. The results more than fulfilled the forebodings, and the patients, speaking generally, revealed a most "imperfect dental exhibition."

There was no selecting of cases. The mouth of each patient was examined, and the first hundred were reported upon. Of course the few patients who paid a return visit during the month were only counted once. Some curious answers to questions were received. One patient said that she never suffered from toothache, and it emerged that she was wearing top and bottom plates, and had none of her own teeth left. Another expectant mother reported that her teeth were in very good condition; inspection of the mouth revealed a tell-tale plate.

The first and most outstanding result of the examination was that in only two patients were all the teeth present in an undecayed condition. The happy possessors of these complete sets were a primipara of 23 and a secundipara of the same age; but it was, perhaps, an ominous fact that the latter complained of toothache and earache. The remaining 98 patients all had more or less