of the same material. A loop of jejunum was brought up through the transverse mesocolon and sewn to the back wall of the stomach along a selected line, a little on the cardiac side of the middle of the stomach. Thick black thread was used. The stomach was divided near the line already mentioned between two clamps so that no leakage occurred. An opening the same size as the one in the stomach was made in the jejunum and an anastomosis made as in gastro-jejunostomy, black thread being used throughout. The sewing of the jejunum to the stomach before the growth was removed greatly facilitated the operation, for the growth was useful as a tractor, and later on the attachment to the jejunum prevented retraction of the stomach during the insertion of deep sutures. The opening in the jejunum began four inches from the end of the duodenum, and by starting it here there was no tension upon the first part of the jejunum and duodenum. Only two layers of sutures were used for anastomosis. The great omentum was not removed but drawn up over the anastomosis and the stump of the duodenum. The opening in the transverse mesocolon was closed by two interrupted sutures. The operation lasted forty-five minutes and the patient was not shocked after it. She was infused during the operation, two pints being run into the armpits.

She was very well the next day, but vomited once or twice. On August 23rd she frequently vomited small quantities of offensive green material, and, as half a pint of sodium bicarbonate solution was given without affording any great relief, the stomach was washed out at 5 p.m. A very large quantity of bilious liquid was withdrawn and the patient felt much better. She was up on the tenth day, and walking about on the thirteenth and eating almost full diet. She rapidly gained weight and did very well. When last heard of, in December, 1924 (ten years later), she was still in excellent health.

CASE II.

A man, aged 64, had had gastric symptoms for years, with some melaena. When admitted to Guy's Hospital he was thin and very anaemic. He was sent up with the diagnosis of duodenal ulcer, but the diagnosis in hospital was carcinoma of the pylorus, with obstruction.

Operation on May 25th, 1922.—Dr. E. A. Scott, the anaesthetist, considered that he would not stand a long anaesthetic and operation owing to his anaemic and bad condition. I therefore performed posterior gastro-jejunostomy well away from a definite pyloric carcinoma, the size of a Tangerine orange, completely encircling the pylorus, ulcerated, hard, and at one side piercing the muscle wall of the stomach and showing peritoneal nodules. There were no secondary growths anywhere, and partial gastrectomy was thought advisable (possibly after blood transfusion) three to four weeks later. However, the patient improved so much that blood transfusion was not necessary before the second operation, which was performed on July 10th, 1922, when about half the stomach was removed. The growth proved to be a columnar-celled carcinoma. Good recovery followed, and when last heard of (January, 1925) he was in excellent health, less anaemic, and better nourished, and in regular work, cleaning cars.

CASE III.

Mr. G., aged 65, after suffering from severe chronic gastritis for three months, was sent by his medical attendant to see a consulting physician, who, instead of a thorough investigation, advised a three months' holiday in Devonshire. After two months the patient returned to London because he was wasting and vomiting so much. Investigation at New Lodge Clinic demonstrated defective filling of the middle of the stomach and complete absence of hydrochloric acid, with much blood in the gastric juice. There was a movable tumour in the left epigastric angle. Laparotomy was advised in the hope that partial gastrectomy would be possible, but the site and extent of the growth made me take a gloomy view of the case. The patient asked for another radiographic examination, and this was done by Dr. Lindsay Locke, confirming the New Lodge findings. I hoped that a mid-gastric sleeve resection would be possible.

Operation on November 2nd, 1922.—A large carcinoma was found in the lower mid-gastric region. It encircled the stomach and markedly constricted it, leaving only a narrow vertical slit. The cardiac pouch was considerably dilated, and its anterior wall folded forwards and to the right in front of the stricture. There were enlarged glands on the lesser curvature, and also below the greater curvature where the growth had come through the peritoneum of the stomach and had infected the general peritoneum, there being many minute nodules all over it, especially in the pelvis. There were also larger lumps in the great omentum, but no secondary growths in the liver. The primary growth could have been removed, but the secondaries negated resection. Complete obstruction was clearly impending, therefore an anterior gastro-jejunostomy (beginning in the jejunum ten inches down) was performed, the posterior operation being impossible owing to the position of the growth. Death occurred from bronchitis with exhaustion a week later.

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THE PREVENTION OF PUERPERAL MORBIDITY AND MORTALITY:

AN EXPERIMENTAL STUDY IN CLINICAL OBSTETRICS.*

BY

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In this paper I propose to give a short account of a series of consecutive midwifery cases which have occurred under my own general supervision in a municipal maternity home. I do so because I am of opinion that it is only by a detailed study of so-called normal labour, and of the slighter cases of puerperal morbidity, that we shall arrive at a full knowledge of the etiology of puerperal sepsis and the explanation of the terrible cases of fulminant puerperal septicaemia occurring after an apparently normal labour. When in possession of that knowledge we may hope to formulate a scheme to eliminate some of the dangers of maternity, and to decide upon a reasonable technique for the actual conduct of labour.

No one can have read the recent correspondence in the *BRITISH MEDICAL JOURNAL* without being struck by the great diversity of opinion expressed both with regard to the lack of improvement in puerperal statistics and the apportionment of blame for such a deplorable condition of affairs. Recently the published statistics of a practitioner¹ throw a doubt on the reliability of the statistics on which these statements are made—and I think he is probably right.

I do not think it can be denied, however, that even if puerperal mortality has really diminished there is still a vast amount of ill health among women of the poorer and middle classes which is the result of the traumata of labour, of sepsis, or of infection present in the patient before parturition. For a good many years I have been interested in this subject from a gynaecological standpoint, and it occurred to me that it would be both interesting and useful to make observations from the obstetrical side to determine how far these results were inevitable, or, if preventable, how they could be prevented. Accordingly I undertook, at the invitation of Dr. Hope, then medical officer of health for Liverpool, the supervision of the new maternity home which was started on his initiative, and which the lack of housing accommodation after the war made so necessary.

The home is small; it can take in only fourteen patients; but since its opening in 1920 1,000 women have been admitted. It was arranged that I should see, as far as possible, every case before admission, and I attended a weekly clinic at the home when women desiring admission presented themselves for examination.

After notes of the case had been taken and the urine tested, I examined each patient, measured the pelvis, and made an internal examination to determine the diagonal conjugate. A specimen of any abnormal discharge was sent to the city bacteriologist for report. Cases of active syphilis or gonorrhoea were referred to a special institution, as the size of the home did not permit of satisfactory isolation. Cases of albuminuria, cardiac disease, or hyperemesis were admitted for ante-natal care, and abnormal cases were kept under regular observation so that the obstetrical treatment required might be carried out at the proper time. The home was well equipped for simple cases, but any requiring Caesarean section were sent to the Stanley or Maternity Hospital, either before labour or when it had started. Each case was as far as possible admitted a day or two before the anticipated date of delivery.

On admission, after a preliminary abdominal examination has been made by the matron or sister, the regulation bath is given and a dose of castor oil and an enema. Before any internal examination is made the vulva is shaved and washed very thoroughly with lysol solution

* Read at a meeting of the London Association of the Medical Women's Federation. A brief abstract was published in the *BRITISH MEDICAL JOURNAL* of March 7th (p. 460).

(1 in 320) over a douche-pan. In emergency cases tincture of iodine is also used.

During labour all those concerned with the case, including the pupil midwives (who are trained nurses), wear sterilized overalls and boiled gloves. Sterile towels are used, and great care is taken to avoid infection from the anus, especially in multigravidae where the perineum has been ruptured or where prolapsed or inflamed haemorrhoids are present.

The matron or sister conducts all normal cases, with the assistance of the pupil midwives, and reports any abnormality that has been discovered during ante-natal examination or that is discovered on admission. Should the case be not proceeding normally they are asked to send for assistance in good time, and where there is slight contraction of the outlet or uterine inertia and the second stage is unduly prolonged, forceps are not withheld if required. If perineal rupture takes place it is repaired at the earliest possible moment, silkworm gut being used. Catgut is avoided as being too favourable a culture medium.

During the puerperium the vulva is swabbed with lysol solution over a douche-pan (each patient has one for her own use) every four hours during the day, and a large sterile pad applied to absorb all lochial discharge. If the perineum is ruptured the wound is kept specially dry, and is touched once a day with tincture of iodine.

To help involution and to avoid a collection of lochia in the posterior fornix, the patient is encouraged to lie on her side part of every day, and to sleep in an exaggerated Sims's position, which is not uncomfortable. Anteversion of the uterus is thus encouraged. In cases of ruptured perineum micturition is performed on the hands and knees, so that the wound is not soiled and catheterization is avoided.

The following is an analysis of the 1,000 patients admitted since the home was opened:

Pre-maternity cases	...	...	...	...	206
Maternity cases—					
Primiparae	...	...	...	390	679
Multiparae	...	...	...	289	
Post-natal cases	...	...	...	...	115

I propose to discuss in this paper the maternity cases only.

MATERNAL MORTALITY AND MORBIDITY.

There has been no maternal mortality and no maternal morbidity (under Central Midwives Board rule) among the cases delivered in the home. I shall deal in detail later with the few cases which have shown any slight deviation from the normal, and their causation as far as it could be traced.

Contracted Pelvis.

Contracted pelvis was present in 130 cases: in 92 of the 390 primiparae (23 per cent.) and in 38 of the 289 multiparae (13 per cent.).

Primiparae.—The rather high percentage of contracted pelvis in primigravidae is probably due to the fact that a proportion of the cases are referred from outside clinics, doctors, and midwives for special observation and care. Of the 92 cases in primigravidae—

1. Natural delivery took place in 36, with 35 living children. The dead child was a pelvic presentation; the mother had slight contraction of the pelvis.
2. Forceps were employed in 17, with 16 living children. The child born dead weighed 9 lb. 8 oz.; presentation right occipito-posterior; slight contraction. The size of the child was not discovered sufficiently early to permit of Caesarean section.
3. There was induction of premature labour in 17, with 16 living children. The mother of the dead child suffered from morbus cordis, which was followed by puerperal insanity.
4. Caesarean section was performed in 18, with 18 living children.

Multiparae.—Of the 38 cases of contracted pelvis in multigravidae—

1. Natural delivery took place in 16, with 16 living children.
2. Forceps were employed in 3, with 3 living children.
3. Premature labour was induced in 16, with 16 living children.
4. Caesarean section was performed in 3, with 3 living children.

Of the total 679 maternity cases natural delivery took place in 601 (88 per cent.).

Table showing Proportion of Contracted Pelvis in 679 Maternity Cases.

	Primiparae.	Multiparae.	Total Cases.
Normal measurements ...	298	251	549
Contracted pelvis ...	92 (23 %)	38 (13 %)	130
Total ...	390	289	679

Complications.

Post-partum Haemorrhage.—Three severe and two slight cases occurred; all survived. The treatment employed was massage of the uterus and pituitrin and ergotin injections. Occasionally a hot intrauterine douche was used.

Adherent Placenta.—Manual removal of the placenta was required seven times, but was in no case followed by pyrexia.

Perineal tears of varying degree occurred in 78 cases of normal labour and 20 forceps cases. Primary union was almost invariable, and there was no pyrexia. Small tears were stitched.

Fibromyomata.—In two cases labour was complicated by the presence of fibromyomata, but progressed normally. In one case the tumours were enucleated three weeks later and were then found to be undergoing necrobiosis.

Twin Births.—Eight pairs of twins occurred, of which four were in primiparae. All the children but two lived—one a pelvic presentation in a primigravida, and the other a vertex with tight short cord. Locked twins occurred once. Considerable delay took place in the second stage. Under anaesthesia one twin was found to be presenting by the vertex with its neck stretched across the neck of the other, which lay transversely. The transverse twin was dislodged and pushed up, and the first delivered by forceps. The other then presented by the vertex and was also delivered by forceps. Both were born alive and survived; one weighed 5 lb. 12 oz., and the other 4 lb. 14 oz.

Occipito-posterior Position.—Eighteen cases of unreduced occipito-posterior position occurred; 9 were delivered by natural forces, 3 by forceps after manual rotation, and 6 by forceps. In one, an elderly primigravida with rigid cervix and slightly contracted pelvis, Caesarean section was performed. All the children were born alive, except in the one instance of large child and contracted pelvis already mentioned.

Placenta Praevia.—Eight cases occurred—2 central, 6 marginal. Two cases of central placenta praevia were delivered by Caesarean section in the Stanley Hospital. Both children were premature; one, though weighing only 3 lb. 11 oz., survived; the other died after a few hours. One multigravida with vertex presentation was treated by rupture of the membranes and full doses of pituitrin. The child was stillborn. The remainder were delivered by natural forces of living children.

Prolapse of cord occurred twice. In the first case the cord was prolapsed and feebly pulsating on admission. Reposition was effected, but the child was stillborn. The second instance occurred with a pelvic presentation.

Pelvic Presentations.—There were 23 cases. In 14 the child was born alive; in 5 the child was premature; in one primigravida with slight contraction the child died during delivery; in one primigravida with large child the infant was stillborn; one (a monstrosity with included twin) died five days after birth; in one primigravida the first twin was stillborn. Caesarean section was performed for two primigravidae with contracted pelvis. Both children were born alive, but one had congenital deformity of both arms (absence of the radius).

Face Presentation.—This occurred twice. One case was born alive by natural forces. One (an anencephalic monster) was stillborn.

Eclampsia.—Although a considerable number of cases of albuminuria were treated, no case developed eclampsia. One case of eclampsia was sent in as an emergency and had had no ante-natal treatment. She was admitted in labour, comatose, with swelling of legs, 7 grams of albumin per litre, and several fits had occurred. One fit took place after admission. Delivery was effected naturally, but the

child was stillborn. The first child had died of convulsions at 8 months. The mother made a good recovery, and when seen three years later the urine was normal.

Induction of Premature Labour.

Three methods have been employed—namely, quinine and castor oil (25), gum-elastic bougies (6), and toy rubber balloons (17). The first method was found to be unreliable, although it occasionally was successful where the child was post-mature. Bougies were discarded partly on account of their slow and uncertain action, partly on account of the risk of carrying vaginal organisms into the upper segment, of rupturing the membranes, or of causing retroplacental haemorrhage. (During bougie induction in one case slight haemorrhage occurred. Labour did not come on, and the patient was delivered three weeks later by Caesarean section. A large retroplacental haematoma was present.) The balloon method was brought to my notice by Professor Lowry of Belfast. A general anaesthetic is employed. The vagina is douched with 1 in 2,000 mercury biniodide lotion, and the uninflated balloon introduced through the cervix, which is fixed by means of modified Collins's lung forceps; 16 oz. of sterile water are introduced with a syringe through tubing tied on a glass tube in the neck of the balloon.

The indication for an induction was usually some disproportion between pelvis and child. There were 17 cases, with 17 living children (one—a first twin in a primigravida—being stillborn owing to some delay with the after-coming head). The average gestation period was thirty-eight weeks, and the average weight of the children 6 lb. 13 oz.

Two cases required forceps—one a right occipito-posterior presentation with long second stage, and the other (a second twin) for uterine inertia. In the third case, induced because of post-mature child and slight contraction, the induction was delayed because of the history of septicæmia in the first confinement and risk of latent sepsis. The patient was removed to hospital, and high forceps were used. The child weighed 9 lb. 8 oz. and was delivered alive. Streptococci were isolated from the urine of the mother (Case v).

In two cases Caesarean section was required—the first a pelvic presentation in a primigravida with diagonal conjugate of 4½ inches; the second a multigravida of 42, who had had four forceps deliveries and one previous induction with a living child of 7 lb. 4 oz.

Forceps Delivery.

Delivery by forceps was effected in 30 cases (4.4 per cent.): in 20 for contracted pelvis (of which 8 were posterior positions); in 3 for cardiac disease; twice for twins, and the remainder for uterine inertia. Low forceps were employed in all but three cases of mid-forceps and the one case of high forceps already mentioned. Contraction of the outlet was noted in 8 cases. The children were all born alive, except the large child in posterior position already referred to. In one cardiac case the premature infant died four hours after delivery.

Caesarean Section.

Caesarean section was performed in 29 cases: for contracted pelvis in 21; for central placenta prævia in 2; for pre-eclamptic conditions in 3; for rigid cervix in 2; and for grave cardiac disease in 1. These cases were removed, either before or during labour, to the Stanley or Maternity Hospital, and operated upon by myself in 25 cases, in 3 cases by Miss Nicholson, M.S., and in 1 case by Mrs. Dobbin Crawford. The mothers all survived, and the children were born alive.

Three neo-natal deaths took place: (1) premature (placenta prævia); (2) premature (pre-eclamptic) on fifth day; (3) spina bifida on fifth day. In 24 cases the puerperium was afebrile and healing was by primary union. In 5 the puerperium was febrile.

Infant Mortality.

Thirty-nine infants were stillborn or died in the first ten days; 22 of these were premature.

Ante-natal death occurred in 12—prematurity 8, syphilis 1, anencephalic monster 1, spina bifida 1, cause unknown 1.

Intra-natal death occurred in 18; 8 were due to prematurity, and the following conditions were responsible for one each—placenta prævia, impacted shoulders, left occipito-posterior presentation with contracted pelvis and large child, achondroplasia, breech presentation with large child, toxæmia of pregnancy, breech presentation with contracted pelvis, twin (tight cord), breech presentation (primigravida), spina bifida.

Neo-natal death occurred in 9—prematurity 6, congenital heart 1, monster (included twin) 1, pemphigus 1.

Infant Morbidity.

There were 7 cases of pemphigus—one (premature, ? syphilitic) died; 3 cases of gonorrhoeal ophthalmia—all recovered; 1 case of congenital blindness; and 8 cases of inflammation of the eyes.

MORBIDITY.

Although no cases in the home itself have reached the Central Midwives Board standard of morbidity, some slight deviations from the normal have occurred. In 5 out of the 29 Caesarean sections, and in one case of high forceps with latent streptococcal infection, there was morbidity (Central Midwives Board).

Latent Gonorrhoea.

CASE I.—A primigravida had been under treatment for gonorrhoea and syphilis in a venereal diseases clinic. Before admission to the maternity home discharge had ceased for some weeks. A normal confinement took place. On the fifth day a rigor occurred; temperature 102.8°, pulse 120. The patient was anaesthetized and the uterus explored. A little membrane was removed; 20 c.cm. of antigonococcal serum was given subcutaneously, together with 10 c.cm. of antistreptococcal serum as a prophylactic against a possible secondary infection. Gonococci only were found in the uterine discharge. Temperature and pulse dropped to normal, and the patient made a good recovery.

CASE II.—A primigravida, single, a dwarf. There had been a vaginal discharge during pregnancy, but no gonococci found. Caesarean section was performed (S.H.). The temperature reached 101° for the first few days and discharge was profuse. Gonorrhoea suspected.

CASE III.—A primigravida with a definite history of gonorrhoea and syphilis. Normal pelvis. In labour four days, with ruptured membranes twenty-four hours. The head was well in the pelvis, but the cervix did not dilate. Caesarean section was performed. The liquor amni was discoloured and there was difficulty in removing the child, which was tightly gripped by the uterus. The membranes and placenta were yellow and unhealthy-looking. Drainage was employed. At the operation 20 c.cm. of antigonococcal serum and 10 c.cm. of antistreptococcal serum were given subcutaneously in saline. The wound was not healthy, but there was no rise of temperature. Gonococci had been found. In this case there is little doubt that the gonorrhoeal infection caused the rigid cervix.

CASE IV.—Primigravida. Husband seafaring man. Normal ante-natal history except for prolapsed haemorrhoids. Normal confinement. Rigor on the ninth day, associated with pain in the right side. Some yellow discharge noted. Intracellular Gram-negative cocci present in pus. Mercurial vaginal douche. No further trouble.

Latent Streptococcal Infection.

CASE V.—A 2-gravida, aged 33. First child stillborn; forceps delivery, followed by septicaemia. She was an unhealthy-looking stout woman with some oedema of the ankles. Diagonal conjugate 4½ in. There had been an occasional trace of albumin during pregnancy. Perineum torn to anus. Induction was delayed on account of a history of septicaemia. When fourteen days overdue balloon induction was employed, as Caesarean section was contra-indicated and the child large. The head remained high and pains went off. She was transferred to the Maternity Hospital. Pulse 132; haemorrhagic vomiting. A living child of 9 lb. 8 oz. was delivered with Tarnier's axis-traction forceps. Some post-partum haemorrhage was controlled by pituitrin. Offensive lochia and raised temperature followed delivery. Streptococci were isolated from the urine. She was given 20 c.cm. of antistreptococcal serum, and made a good recovery.

In this case it is probable that streptococci were present in the bladder during pregnancy and accounted for the albuminuria. No vaginal discharge had been noted.

CASE VI.—A primigravida, aged 25. In this case albuminuria occurred at intervals during pregnancy, and some vaginal discharge was present. A specimen taken before delivery showed short chains of streptococci. Owing to uterine inertia, low forceps were employed for delivery, followed by mercurial douche. There was an afebrile puerperium.

CASE VII.—A 2-gravida, aged 31, with a previous history of prolonged labour with a large child, septicaemia, and white leg. She had had three attacks of appendicitis eight years before, but no operation. There was a trace of albumin in the urine during pregnancy. Labour was normal. On the seventh day she had

shivering and headache; temperature 101.6°, pulse 120. Streptococci in lochial discharge. She was given an intrauterine mercurial douche. The puerperium was normal.

Latent Infection with B. coli.

CASE VIII.—A primigravida with a rickety flat pelvis. Diagonal conjugate $4\frac{1}{2}$ in. *Coli* bacilluria during pregnancy. The head did not fix. Caesarean section was performed and a child weighing 7 lb. delivered. The membranes were yellow and unhealthy. Some temperature during the puerperium with pyuria and unhealthy wound. *B. coli* isolated from urine and cervical discharge.

CASE IX.—A married woman, aged 28; one previous abortion. Diagonal conjugate $4\frac{1}{2}$ in. Occasional albuminuria during pregnancy. In labour twenty-four hours with ruptured membranes. Head above brim; liquor amnii offensive; cervix rigid. Temperature 103°, pulse 104. Caesarean section performed; placenta adherent; drainage. Infant (7 lb. 10 oz.) blue from asphyxia. On the following day the infant had blebs on the fingers and vaginal discharge. Febrile puerperium; rigor on the fifth day. *B. coli* septicaemia. Anticoli serum, 20 c.cm., given subcutaneously in saline. The patient recovered.

In this case, unfortunately, the cause of the albuminuria during pregnancy was not investigated. It is possible that a latent bacilluria was present.

Coli Infection.

CASE X.—A primigravida, aged 25. Diagonal conjugate $4\frac{1}{2}$ in. Head entering pelvis. Membranes ruptured forty-eight hours. Liquor amnii discoloured. Cervix one-third dilated. It was decided to do Caesarean section. A child weighing 6½ lb. was delivered; its head was much moulded. The patient was cyanosed and vomited haemorrhagic fluid in large quantities during the operation. The placenta and membranes were yellowish-green and adherent. The following day the infant's eyes were reddened and vulvitis was present. The mother's condition was serious. She had acute bronchitis with cyanosis, frothy sputum, and incontinence of urine and faeces. The pulse was very rapid and out of proportion to the temperature. Coliform organisms were present in the vaginal discharge. Anticoli serum, 10 c.cm., was given subcutaneously and she made a good recovery.

In this case it is probable that a *B. coli* infection from the rectum supervened during the prolonged labour with ruptured membranes. In one other case there was some morbidity, and the value of a few days' preliminary care in the home was demonstrated.

CASE XI.—A primigravida had been examined at the clinic and slight general contraction found, but it was thought that she would probably deliver herself. She came up in labour a few days before the expected date, the head above the brim. The membranes ruptured, but the head did not fix. Temperature 99.8°, pulse 100. The cervix was half dilated. Caesarean section was performed, and a living child, weighing 8 lb., was removed. The placenta was separated with difficulty. Post-operative bronchitis with rapid pulse and slight temperature occurred. Streptococci were found in the lochial discharge. The patient, however, made a good recovery.

In connexion with cases admitted in labour, the statistics of v. Buben² on the association of premature rupture of the membranes and diseases of the puerperium with marital relations shortly before labour need consideration.

CONCLUSIONS.

From such a small number of cases it is unwise to draw any definite conclusions. I am of opinion, however:

1. That latent or pre-existing infection, streptococcal, gonorrhoeal, or coliform, is responsible for a considerable percentage of cases of puerperal sepsis. That the organism may not infrequently be isolated by bacteriological examination of the urine during pregnancy, especially in cases of streptococcal or coliform infection. That intermittent albuminuria during pregnancy is an indication for a bacteriological examination of the urine, even in the absence of urinary symptoms. That with latent infection uterine inertia is more likely to occur, especially when associated with premature rupture of the membranes. That bacteriological facilities for the examination of discharges during pregnancy, if utilized, will enable suitable precautions to be taken and an appropriate serum to be obtained.

2. That for the prevention of puerperal sepsis cases should be removed from unsuitable surroundings, especially when difficulty is anticipated, and that ample accommodation should be arranged so that patients may be admitted a day or two before labour is anticipated.

3. That a rigidly aseptic technique is as important as for a surgical operation. The patient should be carefully prepared and the vulva shaved before any vaginal examination is made during or immediately before labour. That well trained midwives can deliver a very high percentage

of maternity cases if satisfactory ante-natal examination and care have been given by the patient's doctor, and if skilled medical help, and, if necessary, institutional treatment, can be obtained when required. Co-operation between midwives and doctors should be aimed at, and maternity homes should be worked in conjunction with hospitals where expert ante-natal and obstetrical treatment can be obtained.

4. That with a reliable technique in good surroundings operative measures need not cause puerperal sepsis.

5. That in view of the need for study of the origin and character of the infecting organism in cases of fulminating puerperal fever, such cases should be placed at the earliest possible moment under the care of an obstetrical specialist and bacteriologist with facilities for research on the special type of organism.

In conclusion, I wish to thank Dr. Hope and Dr. Mussen for the extensive facilities they have afforded me; Miss Nicholson, M.S., who has assisted me indefatigably throughout; Professor Beattie and Dr. Ashcroft for their bacteriological reports; Dr. Capon and Mrs. Barton Hall for investigating most of the cases of stillbirth; and the matron, Miss Nicholson (Central Midwives Board), and Sister McCaughey (Central Midwives Board) for their invaluable and enthusiastic co-operation.

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FIBROCHONDROMA OF THE CAUDA EQUINA.

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TUMOURS of the caudal region of the spinal cord are by no means common in hospitals for nervous diseases; still less often are they encountered in general hospitals. On searching the clinical records of the Derbyshire Royal Infirmary we have been unable to find any other example of this condition.

Spinal cord surgery dates back some thirty-six years, when Horsley successfully removed a tumour from the dorsal region of the cord. It was in 1902 that the first lesion of the cauda equina was correctly diagnosed and successfully operated on.

In 1896 Dufour collected 21 cases of tumour of the spinal cord. Of these cases only one had been operated on, and that successfully. In 1908 Spiller² published an account of 9 cases, 3 of which had been operated on, and in one the tumour had been removed. There were 7 deaths, including all 3 who had been operated on.

Several other authors have published accounts of cases attended with greater success, including one of a cauda equina tumour.³ This was removed, and the patient made a complete recovery.

The literature on the subject of the spinal cord tumours was analysed by Steinhe⁴ in 1918; he collected accounts of 330 cases, among which were thirty tumours of the cauda equina. Of the latter, 5 were cured, 9 were improved, and 14 died early.

In the recent reports⁵ of the Mayo Clinic there is an account of 112 laminectomies for supposed tumour of the spinal cord in the years 1910-22. In 85 cases a tumour was found, but in 3 cases only was the lesion in the region of the cauda equina, and of these 2 were due to meningo-myelitis and 1 to a tumour.

The following account is of a patient with typical symptoms, and physical signs, of a lesion of the cauda equina.

G. C., aged 42, a miner, was sent by his doctor in February, 1924, to the Derbyshire Royal Infirmary. He gave the following history. In 1920 he began to suffer from a dull ache in the lower lumbar region, and shooting pains down the back of the right