Rotunda practical midwifery / by E. Hastings Tweedy and G.T. Wrench.

ROTUNDA
PRACTICAL MIDWIFERY

ERNEST HASTINGS TWEEDY
AND
G. T. WRENCH

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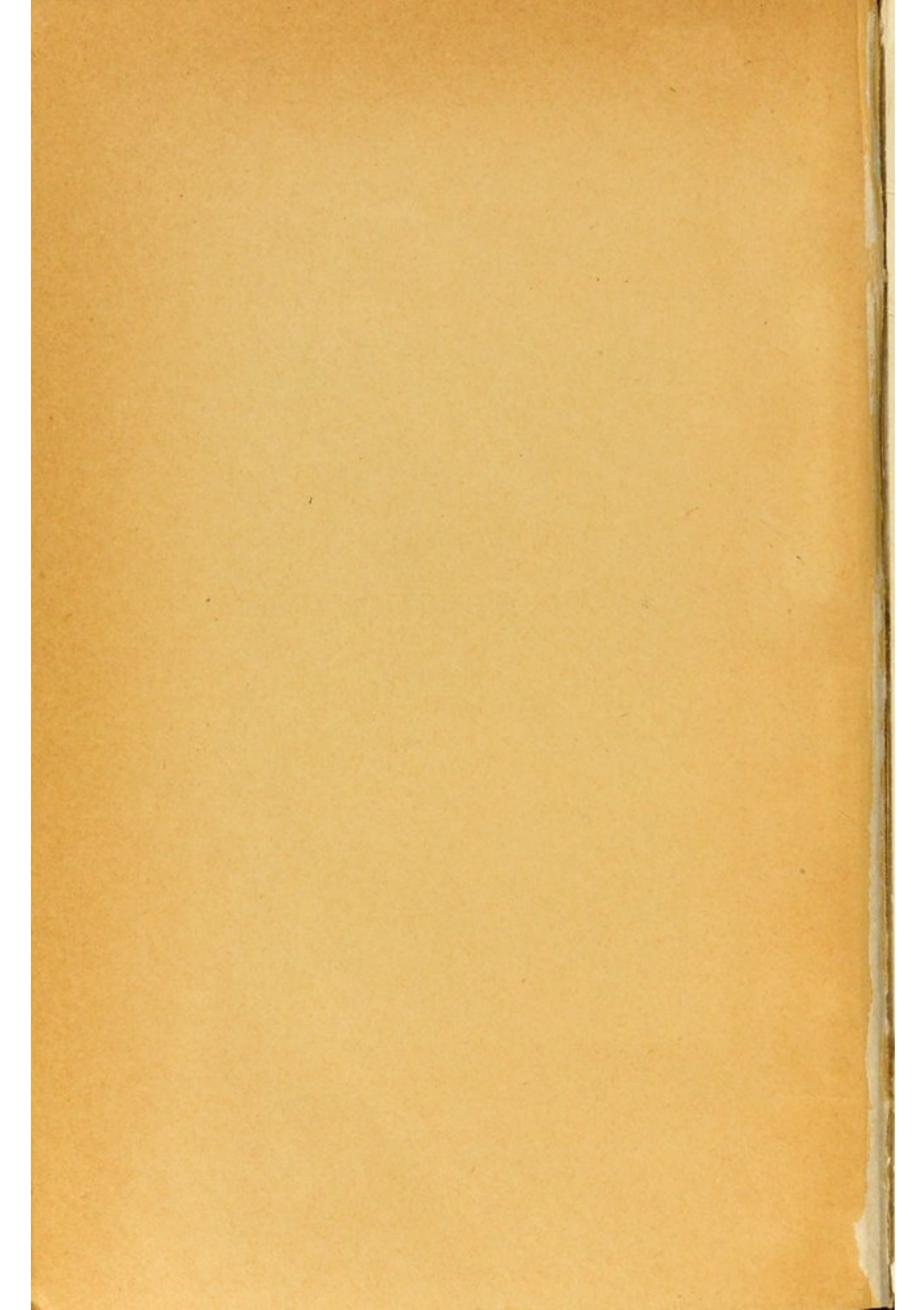
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BY

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PREFACE

THE requirements of practical midwifery are so inadequately provided for in the curriculum of our Universities and Licensing Corporations that it is not an exaggeration to say that many recently-qualified practitioners are a danger rather than a help to their lying-in patient. For this lamentable result the different Examining Bodies must be held solely accountable, for it is unreasonable to expect a student to pursue knowledge to a greater degree than that which is found necessary for qualification purposes.

The present system has produced men with considerable theoretical, but a small amount of practical, knowledge, and it is for those who find themselves in this predicament that this book has been written.

It does not pretend to compete with the very many excellent treatises on midwifery, but omitting all that is theoretical and not immediately useful to the practitioner, it aims at affording him a concise guide in the elucidation of the many difficulties of Obstetrics.

It has been my constant endeavour to press home to students the practical aspects of Obstetrics, and

many of my pupils have expressed a wish that I should publish my lectures in book form. The exigencies of a busy life made this task impossible, but when my Assistant, Dr. G. T. Wrench, offered to incorporate them in a work dealing with the teaching of the Rotunda Hospital I felt that I was fortunate in obtaining the services of such an excellent exponent of my views.

We have dealt with conditions likely to arise, and for the most part such as we have ourselves encountered, and in describing them Dr. Wrench has in simple language striven to present them from the standpoint of the practitioner who has largely to rely on his own resources.

It may be that some practical points are not emphasized as they would be in a lecture, but this loss has been compensated for by brevity, and this brevity has enabled the book to be kept within a conveniently small size.

References and authorities have been omitted as having no practical bearing on our subjects, and in describing methods which we ourselves have found successful, we have endeavoured to avoid confusing the reader by placing before him a variety of courses, many of them no doubt admirable, but in our opinion not superior to those described by us.

Much trouble has been taken with our illustrations, and they are, without exception, drawn from original sources.

To Dr. Dawson, our former Clinical Clerk, we are

indebted for photographs which, taken from the mannikin, have served as the basis for the drawings which illustrate the application of forceps, and many other operations.

Our thanks are also due to Dr. Paul Carton for permitting us to use his collection of contracted pelves, to my friend, Mr. J. Keogh Murphy, F.R.C.S., for his beautiful specimen of a very early ovum obtained during his term of office as External Assistant here, and for much other help.

Lastly we must thank our Publishers for the care they have taken in the production of the book.

E. HASTINGS TWEEDY.

Rotunda Hospital,
Dublin.

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PART I

NORMAL PREGNANCY, LABOUR, AND PUERPERIUM

CHAPTER I

SIGNS, SYMPTOMS, AND DIAGNOSIS OF PREGNANCY

Importance of accurate diagnosis. The importance of the accurate diagnosis of pregnancy is obvious. Its accuracy will always be proved by the event. The doctor is right or wrong. There is no *via media*, as in the rest of medicine, and a mistaken diagnosis cannot be hidden under the shield of the patient's ignorance. Mistakes of the doctor are final, and condemnation of them not to be refuted.

It is on account of this certainty of issue that the signs and symptoms of pregnancy have been divided into those that are certain, and those that are probable. With the certainty of the information conveyed by the foetal signs, of course, we agree, but we think that the other signs, the probable signs, have scarcely had sufficient significance attached to them. With experience of them, their united evidence brings conviction to the mind of the observer, which is practically as positive as the evidence of a sign due directly to the foetus. But the conviction is the private conviction of the observer, based on his own experience, and he may be unduly cautious in committing himself with his patient, owing to his remembrance of the warnings of textbooks that the probable signs may play him false. We tell our patient she is pregnant, when certain probable signs of pregnancy are well presented, and do not wait for the certain signs, unless some especial gravity is attached to the diagnosis, as when a patient is unmarried and denies or is not

asked whether she has incurred the risk of fertilization. Even in such a case, if it is important that a diagnosis should be given before the abdomen becomes prominent, we give the diagnosis when the probable signs are sufficiently well marked to convince us.

The definite diagnosis of pregnancy depends therefore on —

1. *The presence of a sign due directly to the foetus.* These are the foetal heart, the palpation of foetal limbs, foetal movements and ballottement.

2. *A combination of probable signs.* To elicit these signs a little experience is required, and the positive value of the second group depends on the experience of the doctor. A definite diagnosis of pregnancy cannot be made from symptoms, namely, the things that the patient tells her doctor. But symptoms have their value, for they either arouse suspicion of the possibility of pregnancy or agree with the conviction that pregnancy is present.

AT THE END OF THE FIRST LUNAR MONTH OF PREGNANCY

A woman usually comes to the doctor, if she is pregnant, before the signs of pregnancy are definite. The symptom that commonly brings her is cessation of menstruation, and she will come a week or fortnight after the expected arrival of the usual monthly period. Conception commonly occurs in the first week after a menstrual period. Taking this date, the patient, when she comes, will have been pregnant for four or five weeks.

What symptoms will she describe? She will tell you she feels weak, that she has shooting pains in the breast, that she passes her water more frequently, that she has lately felt a little sick in the morning, and that she is constipated.

She may, however, especially if she is a multipara, have none of these symptoms, and only say she has missed a period.

What to do. If she has come to you for the first time, take down her name, length of marriage, number of children, nature of previous labours, symptoms, and address in a book

for future reference. The address is important, for it is very annoying, in the event of a sudden night-call, not to know the exact address.

It is not essential to make a vaginal examination, for little can be learnt at this period. If, however, your patient does not wish to come again, it is better to examine her. There is
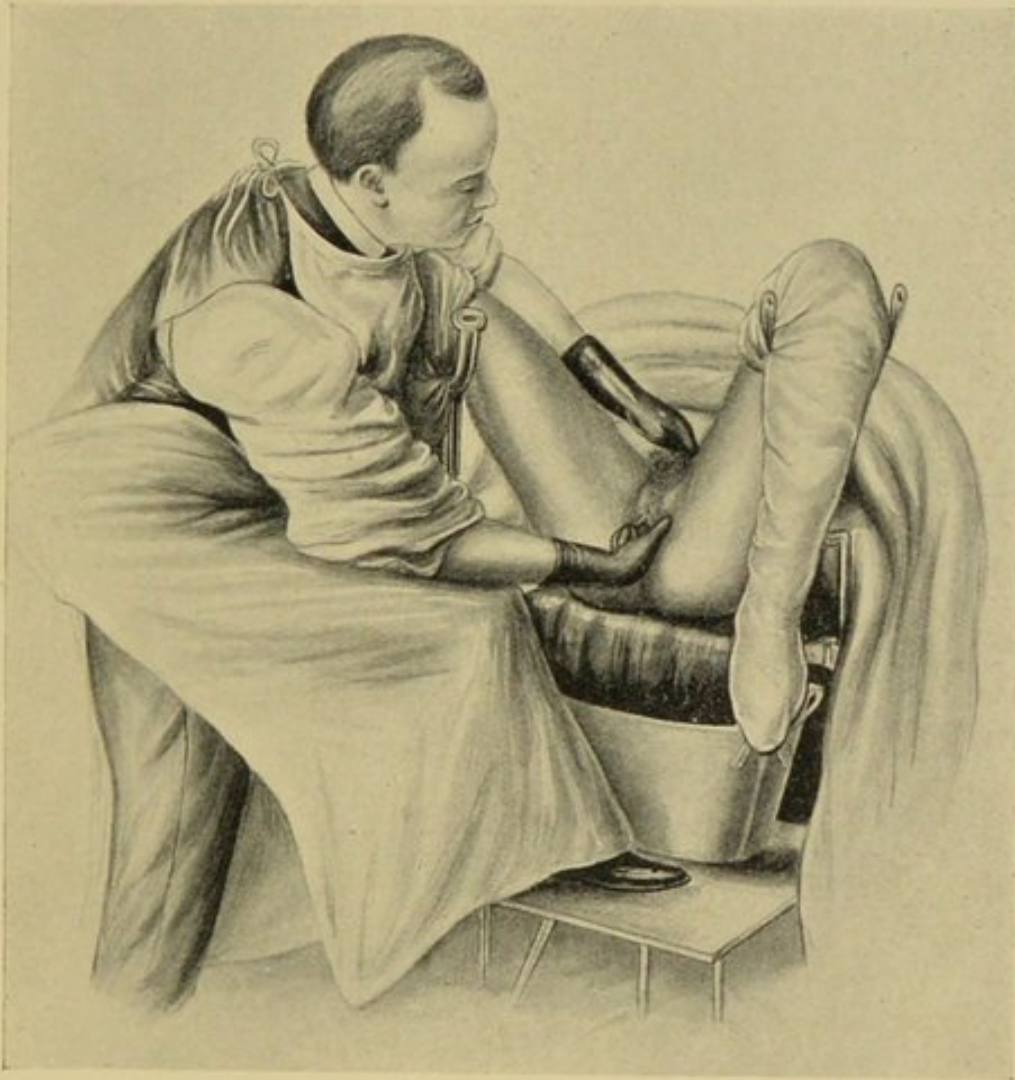
Fig. 1. Vaginal examination. Patient in gynaecological chair.

another condition when it is wise to examine, namely, when the last menstruation is described as being very scanty. It is not uncommon for a woman to lose a little blood on one day only at the next expected period, in spite of the fact that she is pregnant.

Therefore under these two conditions—(1) when the patient
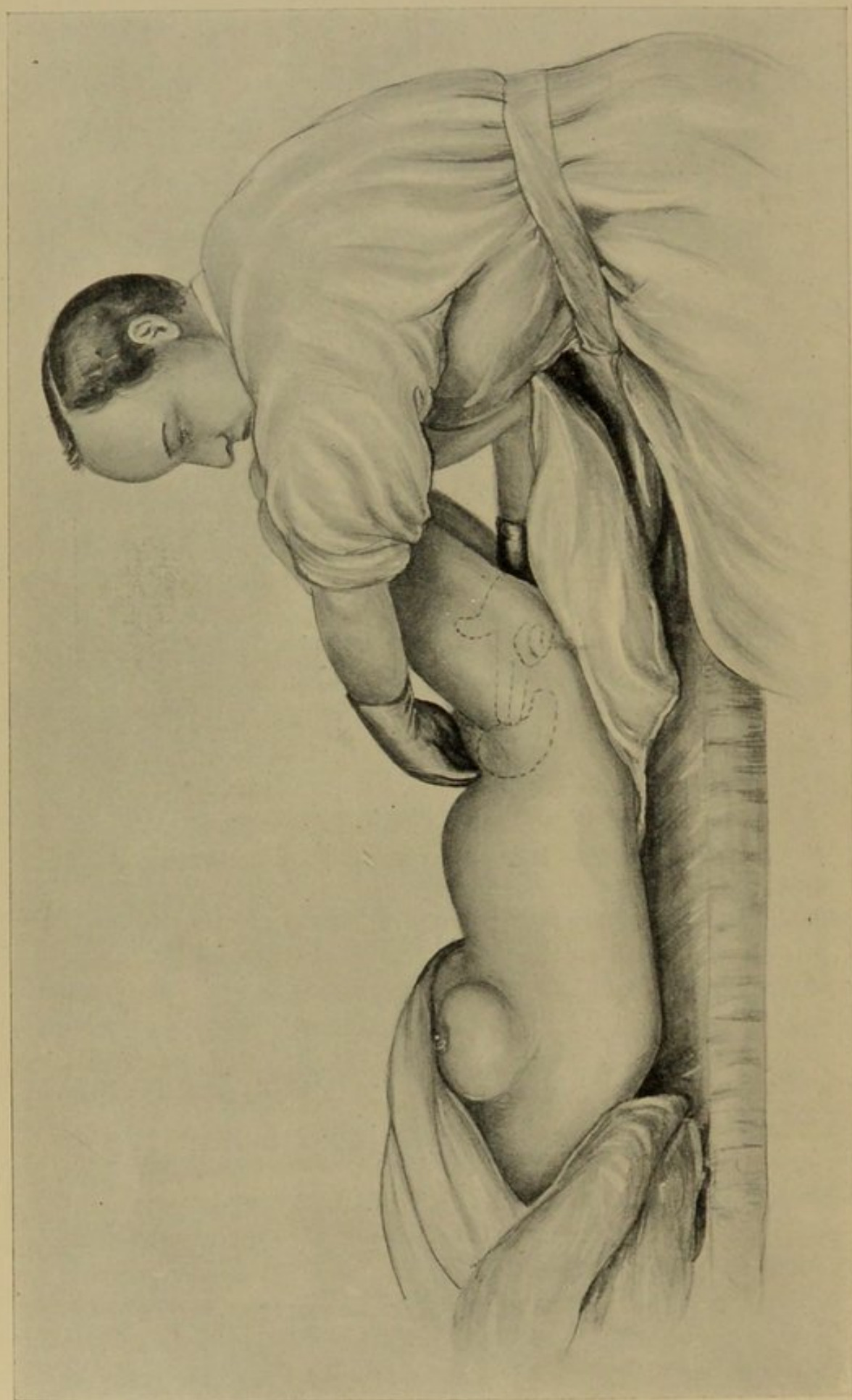
Fig. 2. Method of making a vaginal examination, when patient is on a couch or in bed.

does not wish to come again to know if she is pregnant, (2) when there is reason to suspect that she may be more than one lunar month pregnant—ask her to let you make a vaginal examination.

How to make a vaginal examination. The best position is that provided by the ordinary gynaecological chair. Failing this, the patient should lie on her back on an ordinary couch with her knees drawn up. It is a good plan to get her to stay in bed and visit her. Ask her then to lie close to the edge of the bed on her back, to put two pillows under her shoulders, and a bolster under her buttocks, and to draw her knees up a little. She will get into this position herself, while you are washing your hands and your back is turned to her. It is a very good position for bimanual examination, for the abdominal muscles are completely relaxed. You draw a chair up by the side of the bed and pass your finger in between her thighs, whilst you open the lips of the vulva with your other hand. You can prevent her watching your hands and satisfy her modesty by putting heaped bedclothes over her chest, so as to hide her face. It is useless to attempt to make a bimanual examination with the patient lying on her left side. You cannot get the abdominal muscles to relax, nor can you accurately map out the uterus.

Before making a vaginal examination cleanse the mouth of the urethra with a pledget of wool soaked in biniodide of mercury (1–1000) and pass a catheter. Invariable attention to this rule will save you from diagnosing pregnancy or ovarian cyst, when only a full bladder is present. Still better, go out of the room whilst your patient empties her bladder.

It is not necessary to douche the vagina before examination. If she has heavy whites, it may be cleanlier to do so. If she has a yellow discharge, you should make note of its presence, carefully douche her, and treat the vaginitis. We wear a rubber glove, or finger-stall, for the habitual use of rubber gloves, which can be boiled, saves the hands from becoming infected with microbes and carrying these microbes to other patients. With a little practice one can become almost as skilful with rubber gloves as without them. Wash your hands thoroughly with soap and water and do not dry

them. If your patient is a primipara pass the index finger into the vagina, first separating the labia with the fingers of the other hand and noting the colour and moisture of the labial mucous membrane. If she is a multipara, pass in the index and middle fingers.

Sometimes the patient is very constipated with scybala in the rectum. This makes the vagina tender, and pushes the uterus away from the finger. There is often flatulence as well, which prevents you feeling the uterus accurately. Under these conditions, you had better desist from examination, give her a purge, and tell her to come again when the bowel has been emptied.

What you feel. In the first three lunar months of pregnancy the uterus has sunk into the pelvis, and so the cervix is easy to feel. Later, when the uterus rises into the abdomen, the cervix rises with it and may get out of reach of a short finger. Now, however, you will be able to reach it easily. The tip of it may feel a little soft. By bimanual examination, that is with the fingers of one hand in the vagina and the fingers of the other pressing on the abdomen in the direction of the vagina, the uterus will be felt. It may feel a little softer and more spherical than normal, but that is all. You learn nothing positive by vaginal examination. But you do learn that the signs do not contradict the symptoms given by your patient. If, on the other hand, she has made a mistake in dates, you find the uterus larger than it should be by her dates, and you inquire further into the so-called last menstruation, and examine the breasts.

What to tell the patient. If a woman has previously borne children, her own feelings are of value. In a multipara, the symptoms of pregnancy are of more value than in a primipara, for the former has experienced them before. On the other hand, the signs are not so definite as in a primipara, for the change from the virgin state to the pregnant is more radical than that due to a repetition of pregnancy.

Tell, then, a multipara that, although it is too early for you to detect the signs of pregnancy, her suspicions are probably right. Tell her there is no need for her to see you again if all proceeds normally, and her previous labours were not abnormal.

If, on the other hand, the patient is a primipara and there are reasons to doubt the existence of pregnancy, ask her to come and see you again in two months' time. You cannot rely on what she tells you, and you cannot rely on amenorrhoea as evidence of pregnancy. Your knowledge of medicine and gynaecology tells you of many other conditions, other than pregnancy, which are associated with amenorrhoea. If there is reason to suspect any conditions such as chlorosis, phthisis, haematocolpos, &c., examine for them. Remember, too, menstruation may be delayed or stopped by the nervous effect of the first weeks of marriage, by the desire for a child in a sterile woman, and by many unknown reasons. Lastly, remember a woman may intend to deceive you by a false history of amenorrhea, and may conceal the absence of menses for fear you should tell her the dreaded news of her pregnancy. Again, there are other causes of morning nausea and vomiting. For example, they are not uncommon in chlorosis. Therefore, ask the patient to come in two months' time; the probable signs will then be present, and you will no longer have to depend on her symptoms for your diagnosis.

AT THE END OF THE SECOND LUNAR MONTH OF PREGNANCY

Can a positive diagnosis of pregnancy be made at the end of the second lunar month of pregnancy? We think it can be; if Hegar's sign is definitely present, or if Hegar's sign is not so definite, but is associated with the definite presence of other probable signs. The conviction of pregnancy imparted by these signs is a private conviction. In nearly all cases it is wise to tell the patient, but there are certain cases, where the question of a woman's chastity is entailed, when it is wise to withhold a definite pronouncement of pregnancy until one of the direct foetal signs is present.

What symptoms the patient describes. The patient will describe the same symptoms as at the end of the first lunar month. Nausea, morning sickness, and frequent micturition are more marked, and she may have noticed that her breasts are getting larger. Multiparae, however, often do not have morning sickness, nor is swelling of the breasts yet noticeable.

What to do. Ask her, if she is a primipara, to let you see her chest and examine the breasts. Sometimes you have to examine the breasts covertly, while pretending to listen to the heart, for the patient may not suspect she is pregnant, and, if she is unmarried, it is indelicate to question her.

Breast changes. The breast changes are of positive value in a primipara, but they have no value in a multipara. The breasts are larger and firmer than they were, the veins are more prominent, and the areola round the nipple darkens and spreads. These are all comparative signs and, if you have not seen the breasts before, may not be of much value to you. But the breasts will appear to you different from the virgin's breasts. One sign, however, is strong evidence of pregnancy in a primipara. To obtain it, squeeze the breast gently with the hand from the base towards the nipple. A little clear fluid escapes. This is sometimes found at the end of the second, more often at the end of the third, lunar month. It is a very constant sign in primiparae, but you can often squeeze fluid out of a multipara's breast when she is not pregnant.

Abdominal sign. Next, if the patient is lying down on the couch, examine her abdomen. The hypogastrium is flat during the first three lunar months of pregnancy, whilst the uterus is a pelvic organ. The sign is not of much value, and if the patient is on the gynaecological couch it is not worth while, after ascertaining the size of the uterus by vaginal examination, to disturb her clothes so as to look for this sign.

Signs discovered by a vaginal examination. When the thighs are separated, look along the inner surfaces of them and you will very likely see *venous arborization*, like you see on the beer-drinker's cheeks. They are quite good signs of pregnancy according to Barnes, who attached considerable importance to them.

Next open the labia and notice the *colour of the vulva*. It is a faint violet, like the colour of dusky cyanosed lips. Pass the fingers into the vagina, and in doing so separate the orifice a little and you will notice the *vaginal mucous membrane has a faint bluish tinge*, and small blue varicose veins appear; also that the vaginal mucous membrane

is *moist and soft*, and possibly you may feel *pulsating vaginal vessels* in the fornices. Pass the finger up behind the pubic symphysis, with the bulb of the finger on the bone. Then feel along the posterior surface of the pubic bone, pushing the finger a little up and down and from side to side meanwhile. You will in this way feel a thick cord. It is the *enlarged ureter*, for the ureter enlarges during pregnancy. You will
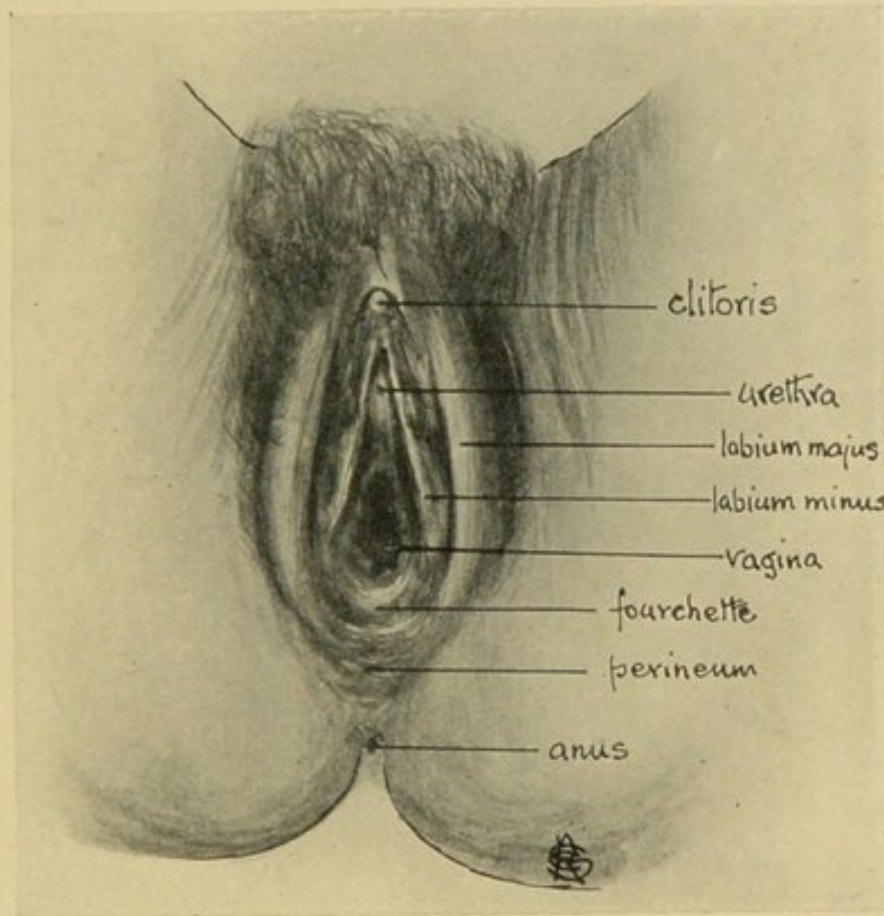
Fig. 3. The vulva.

not always feel it, but we have found it a reliable sign when present.

Next pay attention first to the cervix, then to Hegar's sign, and finally to the size, shape, and consistence of the uterus. We advise this routine method, for unless you adopt a routine method in every case you are apt to overlook one of the signs.

The cervix. The cervix, like the vagina, becomes violet in colour, but it is not worth while to put in a speculum to

see, unless you wish to be sure there is no erosion. The soft-
ness of the cervix is the most marked cervical sign of preg-
nancy. You have to distinguish it from the softness due to
an erosion, and this you can do by putting in the speculum
and looking. An erosion, of course, may be present with
pregnancy. The distinction between the softness of preg-
nancy and that of erosion is not very hard to make. The
erosion softness gives the feeling of softness over a hard core.
But there is no hard core to the softness of pregnancy. The
softness of pregnancy begins at the os externum, and in later
months is shared by the whole cervix. The cervix feels
'boiled through'. If this feeling is made out it is very strong
evidence. A good rule is that if the cervix is as soft as the
lip, pregnancy is very probable, if the cervix is as hard as
the tip of the nose, pregnancy is doubtful.

When softness is well marked, the tip of the finger can be
pushed into or dimple the os externum.
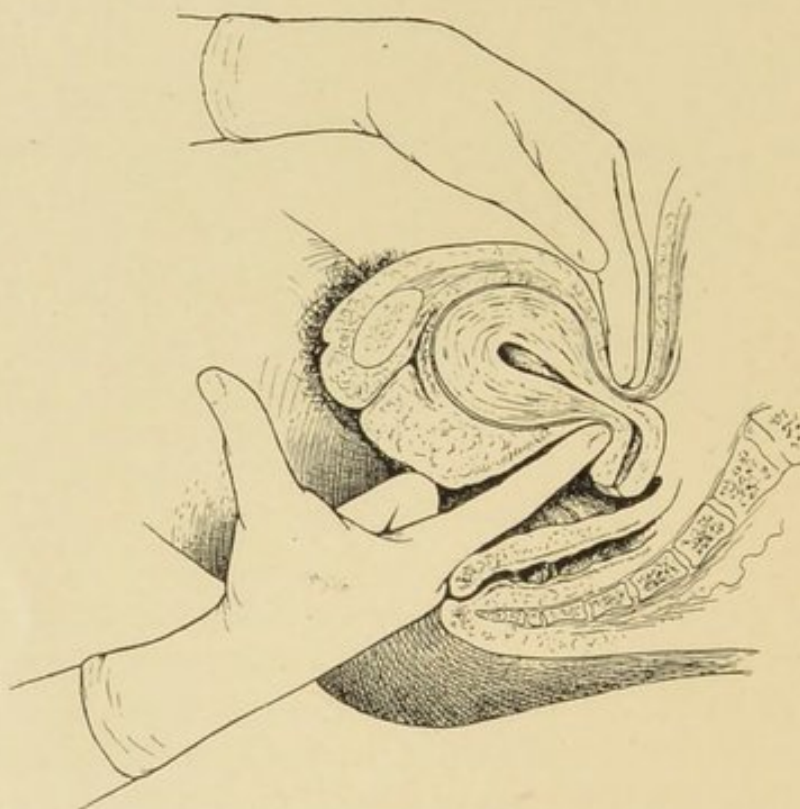
Fig. 4. First method of obtaining Hegar's sign.

Hegar's sign. In the second and third month of preg-
nancy the lower third of the uterus is very soft, compared
to the soft, yet firmer cervix and to the main part of the

body and fundus of the uterus. The demonstration of this is known as Hegar's sign. There are three ways in which you can find out whether Hegar's sign is present or not. (1) Put your finger or fingers in the anterior fornix. Anteflex the uterus with your hand on the abdomen and press the abdominal finger-tips down behind the body of the anteflexed uterus to meet the finger in the vagina. If Hegar's sign is present, although the body feels firm and the cervix firm, yet the lower third of the uterus between them is so soft that it feels no thicker than cardboard. In fact, you think that the body of the uterus and cervix are two independent tumours, and,
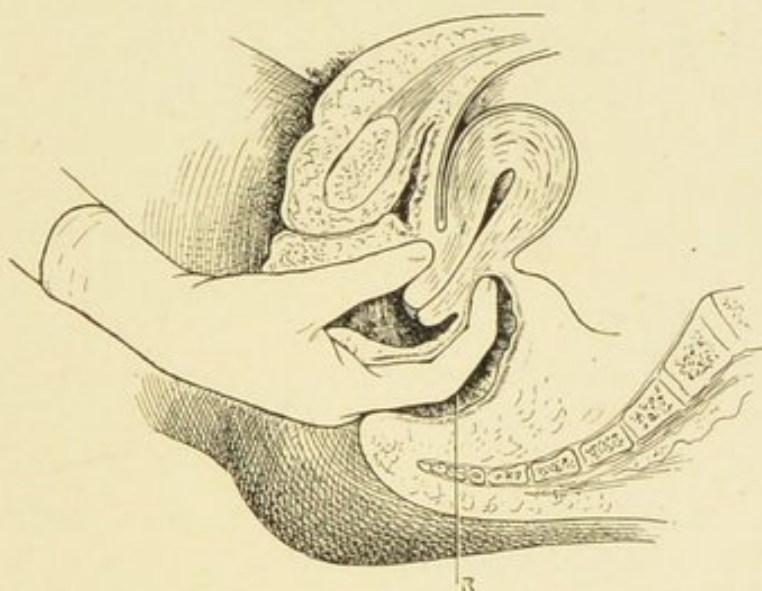
FIG. 5. Third method of obtaining Hegar's sign. R, rectum.

if you try, you will actually be able to move one independently of the other. (2) The second method is to put your finger in the posterior fornix, turn the anteflexed uterus straight bimanually, and press your abdominal finger-tips in just above the pubis to meet the finger in the posterior fornix. This is not quite so good a way as a rule as the first, because it is hard to get the finger to reach high enough up into the posterior fornix above the cervical tissues. (3) The last method is the best of all, but is disagreeable to the patient, and therefore not often adopted. Pass the index finger into the rectum and the thumb of the same hand to the top of

the anterior fornix and pinch the part of the uterus which is just above the cervix between them. Hegar's sign is not present after the third lunar month.

Size, shape, and consistence of uterus. Hegar's sign is made by bimanual examination, so after ascertaining whether or not it is present, proceed to make a careful bimanual examination of the uterus. The uterus at the end of the second lunar month is about the size of an orange. It is anteverted in normal cases. It is more spherical and softer than the non-pregnant enlarged uterus. With care you may be able to distinguish a vertical or oblique ridge in the wall of the uterus, and near the fundus an area of hardness, called the denser spot. This ridge or furrow is supposed by some authorities to separate the part of the uterine body which contains the ovum from the part that is only unoccupied decidual cavity. The denser part is supposed to be dense because it corresponds to the part of the uterus that contains the ovum. Whether this be so or not, when these signs are felt they are very good evidence of pregnancy.

What to tell the patient. Pregnancy is an attractor of blood to the woman's sexual organs and the breasts. Tumours of the uterus, such as fibroids, also attract blood to the pelvic organs, and sometimes reflexly affect the breasts. Blueing of the vulva, vagina and cervix, increased vaginal secretions and pulsation of vaginal arteries, thickened uterus and soft cervix, are consequences of the increased amount of blood. Pregnancy, however, is a far greater attractor of blood than uterine tumours, so that all these signs are present in a more marked degree. It is a question then of degree, of comparison, and therefore experience is needed to settle cases in which the signs are not well marked. With pregnancy there is amenorrhoea; with fibroids, metrorrhagia is very common. Again, all these signs are rapidly progressive with pregnancy, and an increase in intensity is noticed month by month, which is not noticed with fibroids. Hegar's sign, on the other hand, is associated with pregnancy and pregnancy alone. Eden thinks it is due to the non-filling of the lower uterine third by the ovum in early pregnancy. Bearing these things in mind, if Hegar's sign is well marked, tell your patient she is pregnant,

unless the question of her chastity is involved, when it is wise, in spite of your own conviction, not to be too dogmatic.

If Hegar's sign is indefinite (as is not infrequent), yet when in a primipara you find blueing of the vulva and vagina, soft cervix and a little clear fluid expressed from the nipple, you will so rarely err in telling her she is pregnant, that you need not mind the risk. Enlarged ureters, the denser spot, and vaginal pulsation, are useful confirmations, but you would not diagnose pregnancy unless the other signs were present. In a multipara you have her symptoms to help you, and these, with the pelvic signs, will tell you whether she is or is not pregnant.

Sometimes none of the signs are well marked. They are all better marked AT THE END OF THE THIRD LUNAR MONTH, and so you may like to defer your opinion until then, or ask her at the first to come to see you at the end of the third, rather than at the end of the second, lunar month. If the signs are not well marked but she has amenorrhoea, do not tell her she is not pregnant.

AT THE END OF THE FOURTH LUNAR MONTH OF PREGNANCY

Early in the fourth lunar month the uterus ceases to be a pelvic organ and rises into the abdomen. Several changes result on account of this. The uterus no longer presses on the bladder, and so *frequency of micturition ceases*. Morning sickness in normal cases disappears. The cervix is pulled up with the rest of the uterus, and so it is more difficult for the vaginal fingers to reach it. The uterus can also be felt abdominally, just above the pubis.

Other signs of pregnancy appear. One is *increased pigmentation*, which is seen best in brunettes. The linea alba becomes a dark line, dark patches appear about the face, sometimes in a butterfly shape, the so-called pregnancy mask. Other pigment areas of the body assume a deeper tint. This increase of pigmentation is not very important. The other two signs are important. They are intermittent contractions of the uterus and internal ballottement.

Intermittent contractions of the uterus.   This is known as Braxton Hicks's sign.   The pregnant uterus contracts intermittently.   To get the sign, palpate the uterus bimanually. Feel the consistency of the uterus.   If you are lucky you will feel the uterus get a little harder as the result of your manipulations. The change is slight but definite, and may sometimes be felt better in one part of the uterus than another.   The
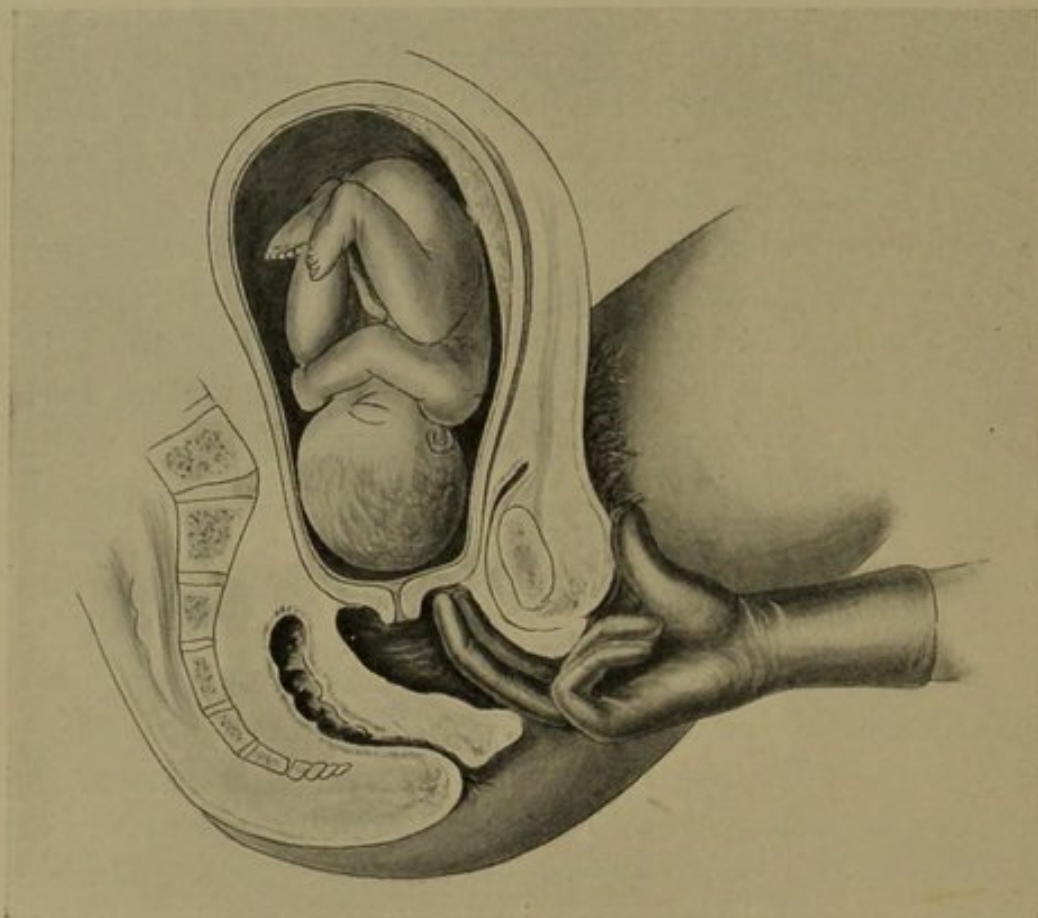
FIG. 6. Internal ballottement.

disadvantage of this sign is that unless your manipulations excite a contraction, you may have to wait for twenty minutes for a spontaneous contraction, and this you cannot well do. If you do feel contractions it is very strong evidence, and, with the signs due to increased blood supply and with amenorrhea, make you certain.   The contractions increase in strength until they become actually labour contractions.   They are therefore particularly useful when examining a woman in

advanced pregnancy, in whom doubt has arisen as to whether the tumour is pathological or physiological.

Internal ballottement. Internal ballottement is one of the foetal signs of pregnancy, and therefore a certain sign. It is due to the fact that the foetus is floating freely in liquor amnii. To get it, having passed a catheter, bimanually palpate the uterus. Place two fingers in the anterior fornix and steady the uterus against them with the abdominal hand. Then push the fingers in the vagina up with a quick jerk and keep them holding up the roof of the anterior fornix. If a palpable part of the foetus was in contact with your fingers, it is suddenly displaced. It floats up into the liquor amnii and returns to the fingers that displaced it with a slight tap. This is ballottement. The displacement is its important feature. The recoil may not be felt. The sign depends on a palpable part of the foetus being in contact with the vaginal fingers. This is not always the case, so you do not always get ballottement. If you do, you can be quite sure that the patient is pregnant. Ballottement is present in normal cases from the end of the fourth up to the seventh lunar month. About the seventh lunar month the foetus ceases to float with sufficient freedom in the liquor amnii to give the sign.

Quickening. At the end of the fourth or early in the fifth lunar month *quickening* may be felt by the patient. These are the first movements of the foetus that are felt by the mother. They are of no value in diagnosis, which depends on the other signs and not on quickening.

AT THE END OF THE FIFTH LUNAR MONTH OF PREGNANCY

The signs, in addition to the size of the uterus, that may be found at the end of the fifth lunar month are (1) Montgomery's secondary areola, (2) foetal heart sounds, (3) uterine souffle.

Size of the uterus. The uterus will be half way between the pubes and the navel. You will only fail to find it if the patient is very fat and keeps her abdomen very hard. To

avoid the latter, palpate gently at first and gradually increase the pressure of the fingers to overcome the tense abdominal muscles. If the diagnosis is important and you cannot get the patient to relax, you will have to give an anaesthetic. If, when the abdominal muscles are slack, you cannot feel the large uterus, your patient is either not pregnant at all, or the period of her pregnancy is wrong.

Remember, too, when making a bimanual examination, to examine for the other signs of pregnancy. Look for venous arborizations of the thighs, blueing of the vulva and vagina, and varicose vaginal veins. Feel for increased pulsation of vaginal vessels, enlarged ureters, the soft, slightly patulous os, intermittent contractions of the uterus (making you sure the tumour is the uterus), and demonstrate internal ballottement.

Montgomery's secondary areola. Examine the breasts and you find them enlarged and netted with superficial and varicose veins. Round the nipple are little tubercles, Montgomery's follicles. The pigment area round the nipple is wider and deeper, and outside this area of dense pigment you may see a mottled area of fainter pigment, the secondary areola. It is best marked in brunettes, and Montgomery says it is a certain sign of pregnancy. It is often not present.

Foetal heart. You can hear the foetal heart by directly applying your ear to the uterus, or by using a stethoscope or phonendoscope. Listen over the whole abdominal surface of the uterus. The foetal heart gives a faint tic-tac sound, which is almost too rapid to count. We have never heard it before the end of the fifth lunar month, and are very glad to hear it then. It is, of course, a certain sign of pregnancy. In the later months you sometimes hear a 'funic souffle' with the foetal heart. It has no significance.

Uterine souffle. There is another sound you may hear, a soft blowing sound synchronous with the maternal pulse. This is the uterine souffle. It is a probable sign of pregnancy and combines with the other probable signs in confirming your conviction, if you are still in doubt.

REMAINING SIGNS OF PREGNANCY

Size of the uterus. The uterus is at the level of the umbilicus at the end of the sixth lunar month of pregnancy. At the end of the seventh it is three fingers' breadth above the navel, at the eighth half way between the navel and ensiform cartilage, at the ninth it is up to, or almost up to, the ensiform cartilage, and at the end of the tenth lunar month, owing to the falling down and forward of the womb, it is again half
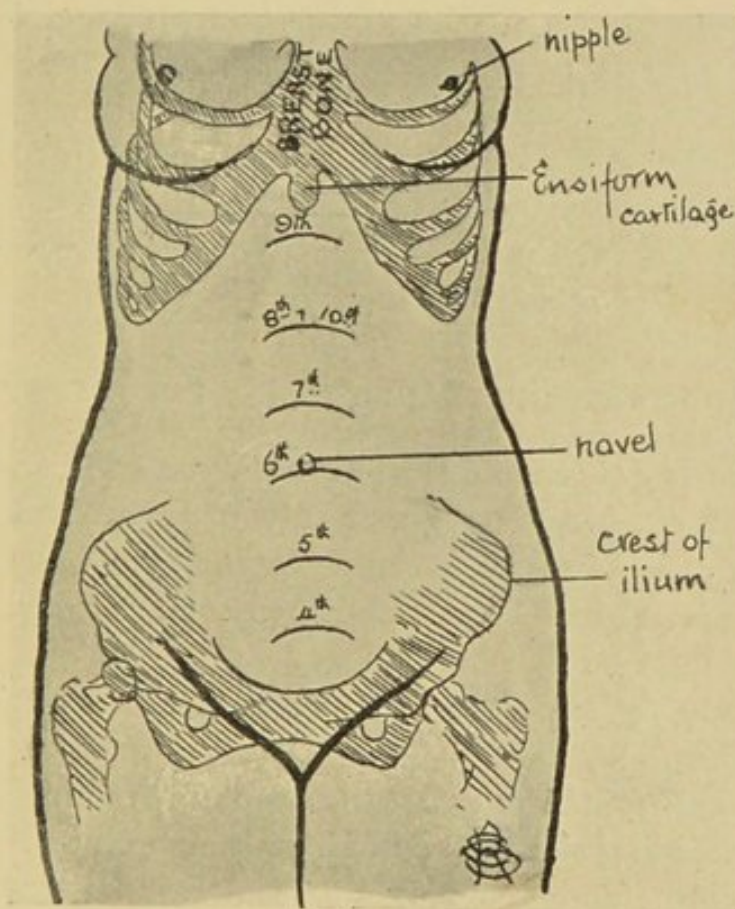
FIG. 7   Height of the uterus at different months.

way between the ensiform cartilage and navel. You will find the height of the uterus of most use in telling the time pregnancy has existed.

Lineae albicantes. The abdominal skin, stretched over the big uterus, shows red patches of stretched skin in the later months. After delivery these become white.

Foetal parts and movements. The detection of foetal parts

and movements are final signs of pregnancy, but you are unlikely to detect them before the seventh lunar month of pregnancy. To detect them, sit down on the side of the couch upon which the patient is lying. Lay the palms of your hands gently on the abdomen, and, gradually accustoming the abdominal muscles to your examination, make little dives with the pads of your fingers. Go over the whole abdominal surface of the uterus. You will feel foetal parts in this way, and you may be able to displace them away from the fingers by a sharp push—*external ballottement*; or, by laying the hands on either side of the uterus and pressing down suddenly, you may feel the foetus jerk up in the space between the hands—another method of external ballottement; or the child may be pushed from side to side. Whilst you are examining, you may feel or see a part of the foetus move; or, whilst listening for the foetal heart, you may hear the gentle tap of a foetal limb as if against your ear.

SUMMARY OF DIAGNOSIS OF PREGNANCY

At the end of the second lunar month you can be practically sure, if you get Hegar's sign, or if you get several probable signs, such as blue vulva and vagina, vaginal pulsation, enlarged ureter, soft cervix and breast signs, with amenorrhoea in a married woman.

At the end of the third lunar month the above signs are more marked.

At the end of the fourth lunar month, frequency of micturition, morning sickness, and Hegar's sign cease. The other signs continue, and you may also find intermittent contractions of the enlarged uterus, and perhaps internal ballottement (certain sign).

At the end of the fifth lunar month Montgomery's secondary areola, the foetal heart (certain sign), and the uterine souffle add their evidence, but are by no means constantly present.

At the end of the seventh lunar month, though you now fall to get internal ballottement, you have the help of external ballottement, foetal parts and movements (certain signs).

The size of the uterus corresponds to the time pregnancy has existed.

Diagnosis of pregnancy complicated by tumours or other conditions. The signs already given enable you to tell whether your patient is pregnant or not. The aid of gynaecology, surgery, or medicine must be summoned to diagnose any other condition existing with it. One simple point is worth mentioning, namely, that the pregnant uterus, towards full term, flattens out the umbilicus, whereas fat and flatus do not.

HOW TO PREDICT THE DATE OF THE ONSET OF LABOUR

Your patient will ask you not only if she is pregnant but when she is likely to have her baby. There are four ways of telling when a woman is likely to have her baby. The first is by the date of the cessation of the menses; the second, from the time of quickening; the third, by the height of the uterus, and, in the last weeks of pregnancy in a primipara and the last days in a multipara, the falling forwards and downwards of the uterus will help.

From the date of the cessation of the menses. Although 280 days is the average duration of pregnancy, this average, like all averages, is rarely accurate in any one particular case. Conception is supposed to take place, as a rule, within the week following the cessation of the menses. Sometimes it takes place between the periods or immediately before the period. What has happened to a woman in one pregnancy is likely to happen to her in another, therefore if a patient tells us she was a week or more too early in a previous pregnancy, we are accustomed to deduct a similar period of time in calculating the duration of her present pregnancy. With this exception, we adopt the following rule. We take the date of the last day of the last period, add seven days to it and count back three months. For example, if the last day of the last period was January 3, the addition of seven days makes January 10, and counting back gives October 10 as the probable date of the onset of labour. This rule gives 280 days for nine months of the year,

and the difference in other months or in leap year matters little, for 280 days is only an average. We find our predictions as good as if we decided by more elaborate tables. For all that, the prediction may be a fortnight too early or a fortnight too late. For this reason, if patients are coming up from the country to be attended by you, it is advisable to ask them to come up a fortnight before the calculated date.

Quickening. Quickening most commonly occurs in the eighteenth week. Add twenty-two weeks or five calendar months to the date of quickening. For example, if quickening occurred on June 4, labour may be expected about November 4.

The height of the uterus. The height of the uterus at different months has already been given. If the three reckonings from the cessation of menses, quickening, and the height of the uterus agree as to the date of labour, it is well. But if they do not agree, rely principally on the reckoning from the height of the uterus.
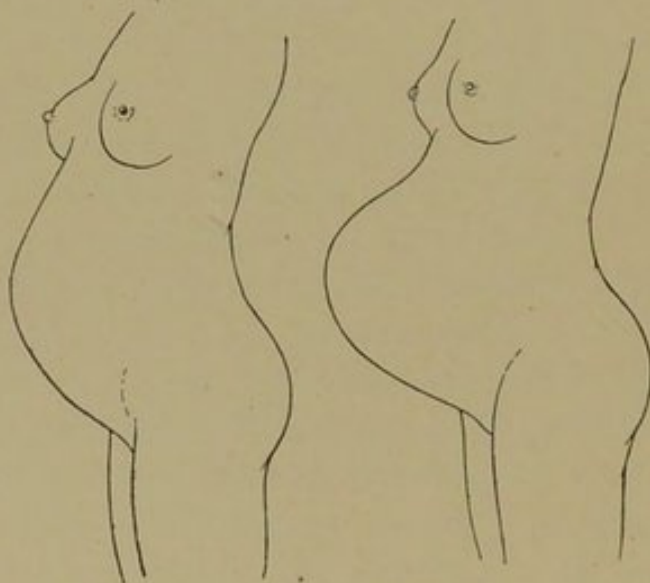
FIGS. 8 and 9. Falling down and forward of the uterus.

Falling down and forward of the uterus. This occurs about three weeks before the onset of labour in a primipara, and about three days before labour in a multipara. It is, therefore, especially useful in a primipara who is a month wrong in her calculations. You can easily tell

whether the uterus has fallen or not, by placing the palm of your hand on the fundus. If the uterus has fallen down and forward, the fundus forms a definite shelf on which your hand can rest, very different to the gradually receding fundus, over which you cannot fit your hand like a cap before the uterus has fallen. Before it has fallen, the large uterus of the ninth lunar month constrains the action of the diaphragm, and may cause the patient difficulty in breathing. She may have to be propped up by pillows at night. Falling down relieves this, and she will tell you she can now breathe freely at night, but that— and this is owing to the sinking of the uterus into the pelvis—she has to pass her water more frequently, has pain in her legs and greater difficulty in moving about. Rely chiefly on this occurrence of sinking of the uterus in primi- parae. It is often not definite in multiparae.

What advice to give to the patient in addition to telling her that she is pregnant. She will ask you what to do whilst she is pregnant.

One fact of practical experience is to advise her not to tell her friends until nearly the end of pregnancy. We have known primiparae to be terrified by the injudicious gossip of their friends.

Women who have social functions to carry on, often wear tight corsets. Tight corsets press on the swelling abdomen below and the swelling breasts above. Therefore tell her not to wear her corsets at all tight. If your patient can go to the country so much the better, for there she can walk about unobserved.

As for the hygiene of pregnancy, the ordinary regard to what is healthy is more necessary than at other times. Fresh air is necessary and walking is good. Let her have plenty of fresh air in her sitting-room and sleep with her window open. We used not to object to her bicycling, but now we advise against bicycling. 'What is she to eat?' she will ask. Answer her that she can eat anything that she can digest, but only at meal times. Do not let her destroy her natural appetite by drinking milk between meals. She must not eat too much, for pregnant women are apt to eat too

much 'to keep their strength up'.   If she becomes peevish as regards her appetite, order her plain, wholesome food and have done with her caprice.

She will do well to take a daily bath.

Toxaemia is the commonest cause of pregnancy troubles. To avoid the collection of toxines in her system, tell her to drink at least two pints of water a day: when she rises and before bed time are good times for her to drink a large tumbler of water.   Above all, tell her to keep her bowels open once a day.   Senna, cascara sagrada, Apenta water in the morning, or Burroughs and Wellcome's vegetable laxative tabloids, are all good laxatives.

CHAPTER II

THE MINOR AILMENTS OF PREGNANCY

Morning sickness. Morning sickness is common in women between the first and fourth lunar months of pregnancy.

The patient either feels or is sick directly she gets out of bed in the morning. Treat her by telling her to take a meal of tea and toast before rising. This will often allay the sickness. It is very important that she should have her bowels opened daily and drink freely of water. If the sickness does not stop, give her light diet and some gastric sedative, such as Sodii Bicarbonatis gr. xv, Spir. Amon. Aromatici ℥xx, Inf. Gentiani ad ℥j, three times a day half an hour before meals; or give her Bismuth Oxycarb. (gr. xxx) suspended by Pulv. Tragacanth. Co., or Fairchild's Pepsencia. If the sickness becomes troublesome, make a vaginal examination. Erosion of the cervix or a displaced womb seem to have the power of causing severe morning sickness, for with their cure the sickness sometimes ceases.

Vomiting that makes the patient ill comes under the head of hyperemesis and is one of the serious diseases of pregnancy.

Varicose veins. These are especially apt to be troublesome in multiparae. The treatment is the usual surgical one, namely, to keep the legs bandaged, bandaging from below up, and rest with the legs elevated. Either use a Martin's bandage with long tapes, which are wound round the bandage after you have applied it, crossing and recrossing from above down and tied at the ankle; or better, use a crêpe bandage. A Martin's bandage must be washed every night. Lastly, show your patient how to bandage a pad of lint or a roll of handkerchief over the vein, so that she may stop the severe haemorrhage, if the vein ruptures.

Pruritus. Pruritus of the vulval region is common. It

may be due to haemorrhoids, vaginal discharge, or venous stasis.

Treat the haemorrhoids just as when they occur apart from pregnancy, with the exception that operation is contra-indicated. Treat, too, any purulent vaginitis, as it is essential to get rid of purulent vaginitis before the onset of labour. The heavy whites some women have, when they are carrying, keep the external genitalia moist and cause itching. Give her some lead lotion (℥ ss. of the Liq. Plumbi Subacetatis Fort. to the pint of water), and tell her to wash the parts night and morning with soap and water, to bathe the parts with the lotion, and finally to dry herself and powder with Violet powder or with a powder composed of Boric Acid one part, Zinc Oxide three parts, and Starch six parts. Resinol oint-ment, or an ointment containing menthol or tar, is often effi-cient, and by its greasiness protects the parts from perpetual moisture. You should avoid advising douching, unless the irritation is unbearable, for douching has some tendency to produce a miscarriage. A woman douches herself with a nozzle and douche can, placed about 1½ to 2 feet above her hips. She can best douche herself when reclining in a warm bath. She can also use a large glass syringe, which can be boiled daily. She douches herself with the same lead lotion.

If the itching is mainly due to venous stasis, order her to take sitz baths, to wash herself with Ichthyol soap and after drying to rub in some of Pazzo's resinol ointment. When the whites and the pruritus have ceased, stop the treatment.

Toothache. If we detect bad teeth in the early stage of pregnancy, we advise the patient to go to the dentist, for her teeth are very likely to pain her and give her neuralgia. It is always well to look for bad teeth. If the patient gets toothache in the latter half of pregnancy, unless the pain is very severe, palliative methods are to be used.

Sore gums and salivation. Both may annoy the patient. A tooth powder and tooth brush used frequently with an astringent mouth-wash, such as Alum gr. x to the ounce of water, or one of perhydrol, will allay these nuisances. You can give belladonna for the salivation, but it is not easy to cure.

Headache. Headache is commonly due to constipation. It will be dealt with under the toxaemia of pregnancy.

Cramps. Weakness. Bearing down sensations. Flatulent dyspepsia. Heartburn. All these are not uncommon in pregnant women. Attention to the general hygiene and a gastric tonic medicine will relieve the patient.

Finally, do not let your patient take too many medicines. Women are very fond of taking medicine for trifling ailments.

CHAPTER III

THE OBSTETRICAL KIT

The bag and its contents. In choosing a bag, choose a large one that will conveniently hold all the things you want. We find a cowhide bag that remains open by stays the best. It should have an inside lining, which can be taken out and boiled, for it is difficult to keep a leather bag clean unless this is done.

Some obstetricians carry their outfit in a large sterilizer with a cover that fits over it. It contains a spirit lamp with three flames. They are able to sterilize their instruments at the bedside, and this would be ideal, were it not that the water takes some time to boil. This delay is the chief objection to this method of carrying and preparing the instruments. In a case of emergency, time may be lost upon which the safety of the patient depends, for sometimes the water takes more than a quarter of an hour to boil.

We prefer to carry our instruments, already sterilized and wrapped in sterile cases, in a cowhide bag. The bag is also lighter than the sterilizer and can be strapped on the carrier of a bicycle.

[One of us has adapted a Samway's staircase bandage box (16 in. × 6 in. broad and 11 in. deep) as an obstetric case. The divisions are taken from the two upper tins. These tins are cleaned by wiping them out with Mercuric Sublimate Solution (1–1000). A sterile towel, boiled and then dried in the oven, is laid out on the floor of the second tin of Samway's box. The instruments are boiled in weak soda solution in a sterilizer. They are taken out and thrown straight into this towel, which is then folded over them. They dry by their own heat and do not rust. The upper tin or lid is closed. All the instruments which are likely to be needed at a difficult case are thus wrapped in a sterile towel and shut up in a clean tin, which never need be opened at
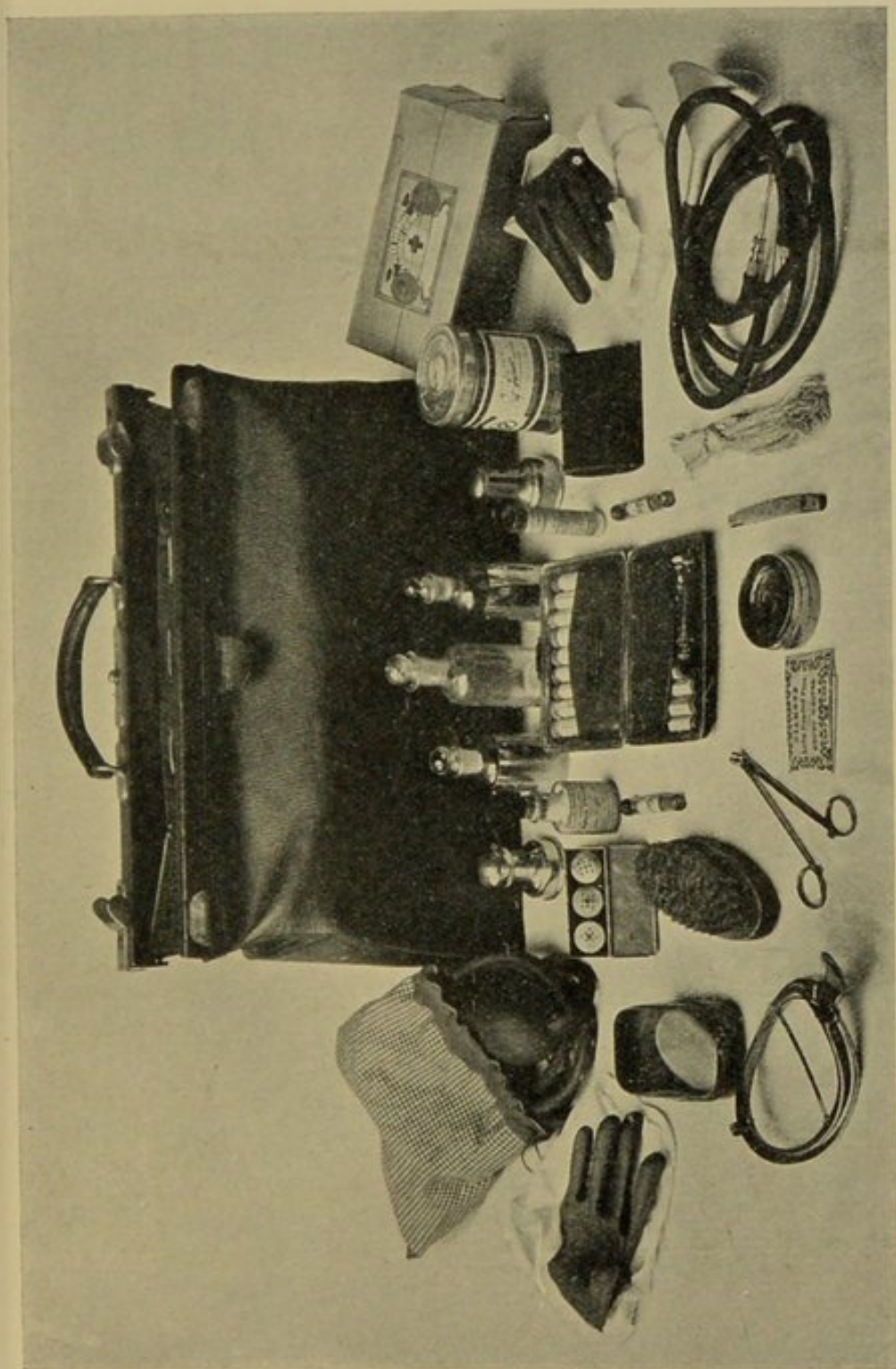
Fig. 10. The bag and contents. The contents are, from left to right: 1, rubber glove and batist bag; 2, Rotunda douche in bag; 3, soap and soap dish; 4, chloroform mask; 5, dusting powders in box; 6, nail brush; 7, needle-holder; 8, biniodide of mercury tabloids; 9, catgut in tube; 10, packet of binder pins; 11, bottle of lysol; 12, bottle of chloroform; 13, bottle of creolin; 14, hypodermic case; 15, perineal and cervix needles in box; 16, pocket lancet; 17, soloids of sodium chloride; 18, catgut in tube; 19, waxed thread for tying the cord; 20, Dührssen's tin; 21, case for chloroform bottle; 22, breast infusion apparatus; 23, packet of absorbent cotton wool; 24, rubber glove and batist bag.
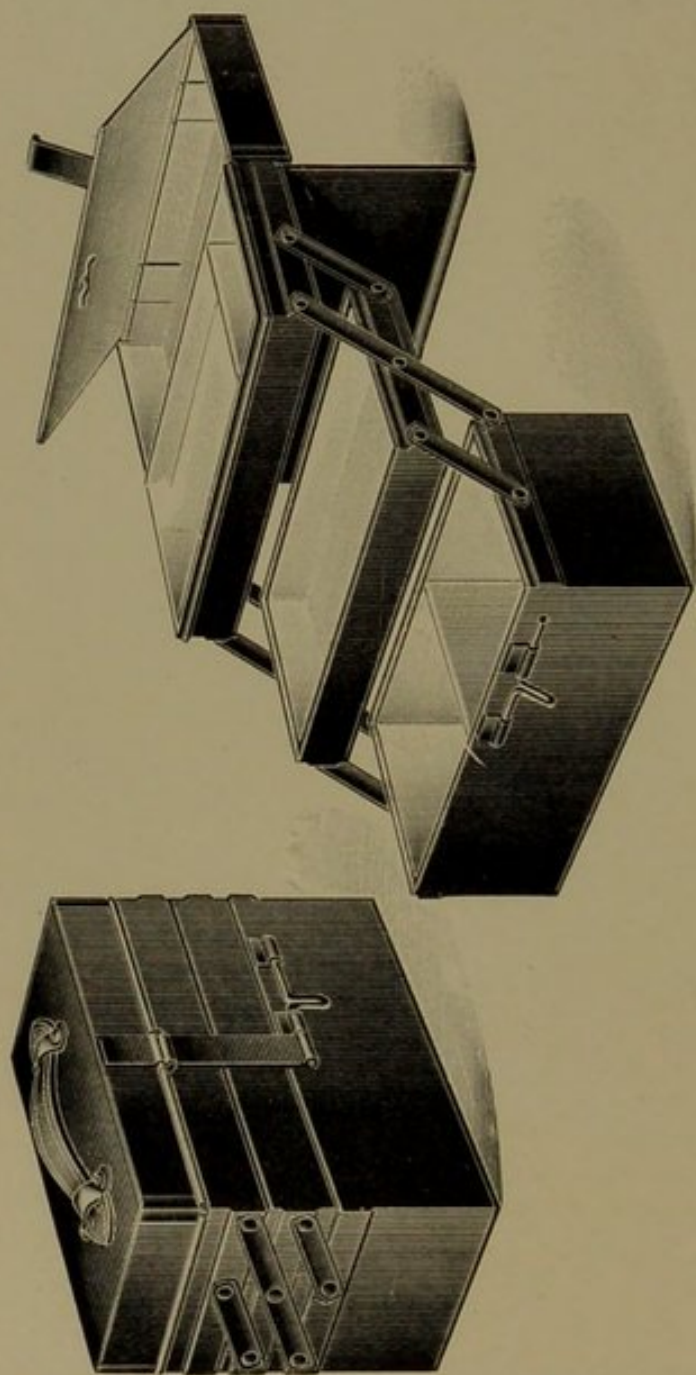
Figs. 11 and 12. Samway's staircase box. The divisions of the upper two tins should be removed and a carrier for bottles fitted into one division of the lower tin.

a normal case. In the third tin, spare instruments are carried,—such as needles, needle-holder, scissors, catheter—which are likely to be needed at a normal case, with two sheets of batist, about a foot square, that have been folded, boiled and dried whilst still folded, so that their inner surfaces are clean, and a clean penny towel for drying used instruments. The lower large tin has two compartments. In one are divisions for bottles; in the other, dressings, chloroform mask, gag, &c.

Things that are often damp, such as gloves, douche, apron and small mackintosh sheet, are carried in a separate leather bag, which also serves for soiled instruments, when delivery of the patient is over. A canvas cover fits the Samway's box, which is easy to carry and is not so heavy as a leather bag. The great advantage of this arrangement is that it is orderly, and the instruments needed for an abnormal labour are in a separate compartment which need not be opened at a normal case. The patent staircase hinge of Samway's bandage box is very convenient. The white paint that lines the box should be removed and aluminium paint substituted.[1]]

We carry the following instruments to all cases :—

1. Barnes' forceps with Neville's axis-tractor.
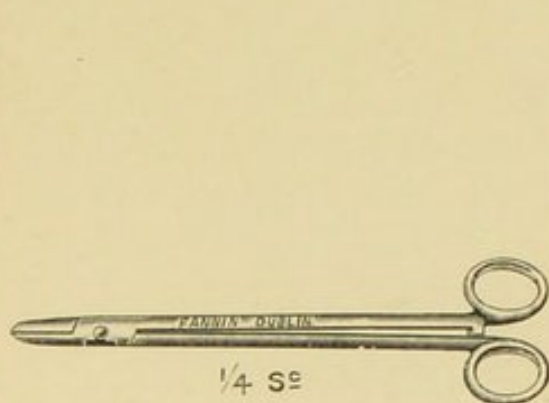
FIG. 13. Needle-holder.
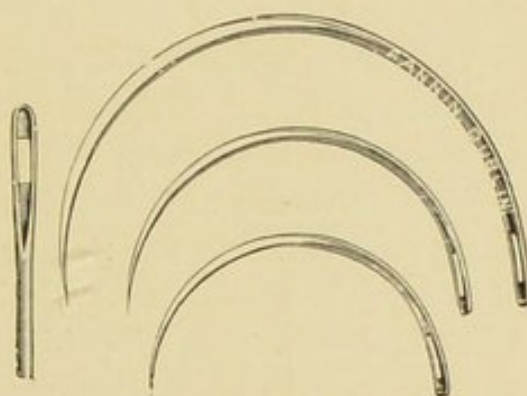
FIG. 14. Large and small curved needles.

2. Martin's needle-holder.

3. Large and small curved needles for perineum and cervix.

[1] These tins can be supplied in Dublin by Messrs. Smith and Shepperd, Stephen's Green ; and in London by the Holborn Surgical Instrument Company. The price is 24s. 6d.

4. Large and small Bozemann's catheters.
5. Rheinstadter's flushing spoon curette.
6. Bullet forceps.
7. A pair of stout, sharp-pointed scissors.
8. A small pair of scissors.
9. Plugging forceps.
10. Two glass vaginal nozzles.

FIG. 15.   Box for sterile needles.

11. Two needles for infusion under the breasts.
12. A metal female catheter.
13. No. 12 or 14 gum elastic male catheter.
14. Mucus catheter, such as Carton's, for mucus in child's throat.
15. Baby's silver catheter.
16. A pocket lancet.
17. A small trocar and cannula.

The first twelve of the list of instruments are carried sterile in calico cases with loops of tape to keep them in position. These calico cases can be bought from any instrument makers. They are boiled, dried in the oven, and their inner surfaces ironed. The twelve instruments (with a second vaginal nozzle and infusion needle) are scrubbed, and boiled in soda solution for five or more minutes. They are picked out with sterile forceps, slipped into the loops, and dry by their own heat. The sides and bottom of the case are folded over and the case rolled up and tied round with a tape.

To avoid having to resterilize all the instruments after each midwifery case, another canvas bag is carried, which holds catheter, perineal needles, needle-holder, and scissors for ordinary labours. The remaining instruments are carried unsterilized. They can, if they are wanted sterile, be boiled in a saucepan at the house. It is well to have a second set of bags, which are ready and sterilized, whilst
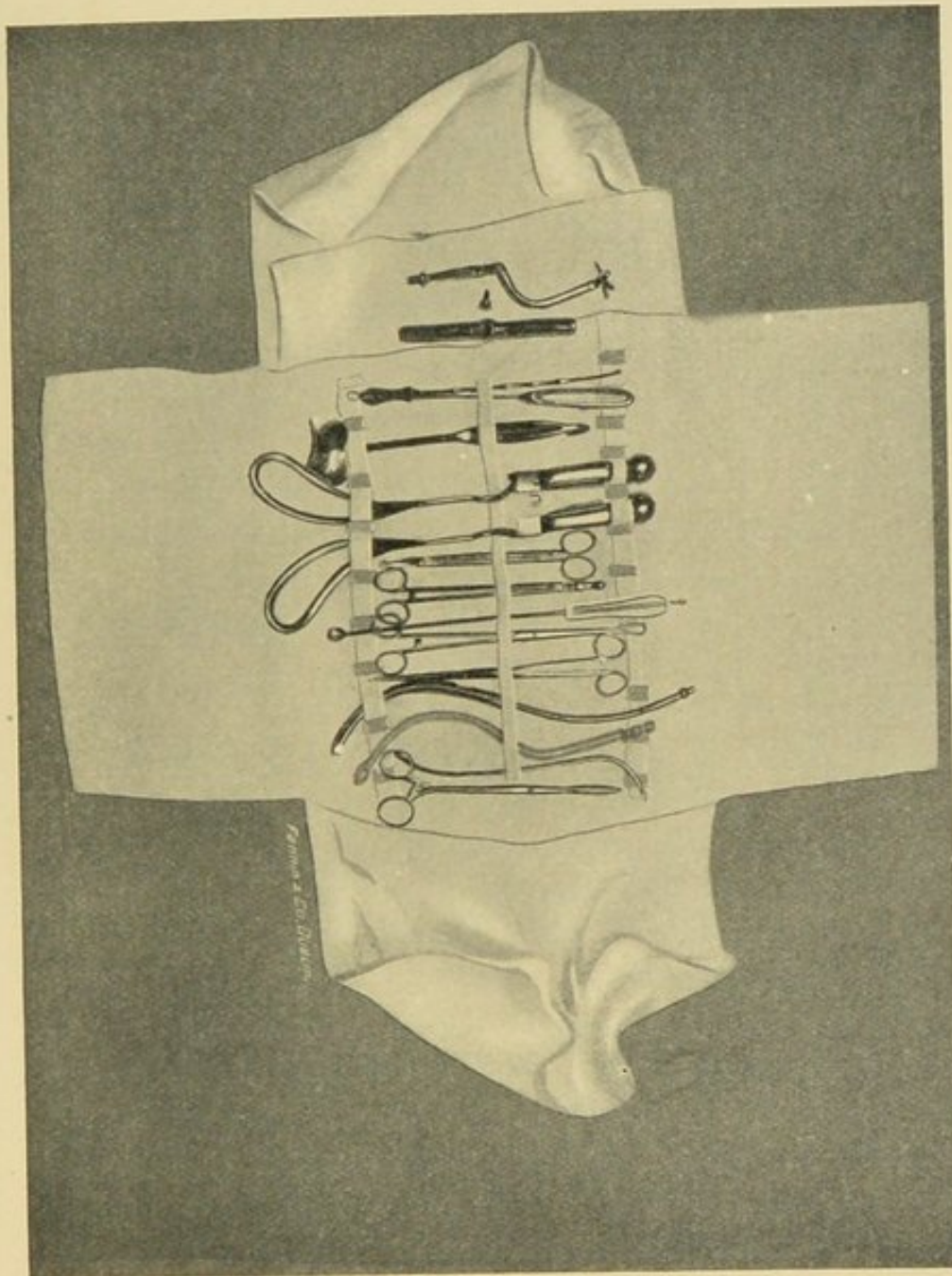
Fig. 16. Instruments arranged in a sterile case. The instruments from left to right are : 1, uterine forceps ; 2, female catheter ; 3, vaginal douche nozzle ; 4, Bozemann's catheter ; 5, plugging forceps ; 6, bullet forceps ; 7, Rheinstadter's flushing spoon curette ; 8, needle-holder ; 9, scissors ; 10, 11, forceps ; 12, posterior speculum ; 13, sharp curette ; 14 uterine sound ; 15, 16, Neville's axis-tractor.

the others are in use, for a second midwifery call may come before the first set have been resterilized.

In addition to these instruments, we carry—

1. Rotunda douche. The use of this will be described at the end of this section.

2. Two pairs of rubber gloves.

3. Two threepenny nail brushes.

4. Infusion apparatus apart from infusion needles.

These are carried in separate batist bags, or envelopes which button down, in which they are boiled before being put into the cowhide bag. After boiling them, hold the bags or envelopes upside-down to let the water run out, and put them all in a large, dry batist case.

5. Catgut, which can be bought ready sterilized in little bottles with perforated corks, through which it can be drawn and a sufficient length cut off; or salmon-gut sutures in corrosive sublimate.
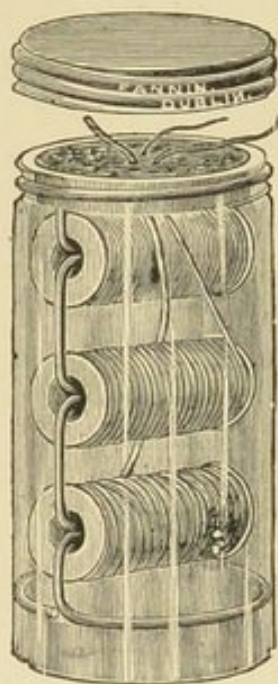
Fig. 17. Sterilized catgut in bottle.

6. Chloroform ($\mathfrak{z}$ iij), and Skinner's mask, tongue forceps and gag.

7. Opium tabloids in bottle.

8. Sodium chloride soloids for infusion.

9. Biniodide of mercury tabloids in bottle.

10. Squibb's ergot.

11. Creolin.

12. Lysol.

13. Two Dührssen's tins of iodoform gauze, which are very handy for plugging the uterus or vagina.

14. A jar of sterile wadding tightly packed.

15. A hypodermic case with morphia, strychnine, ergotinine, digitalin, cocaine and atropine.

16. A small bottle of brandy for hypodermic injections.

17. A small bottle of ether for hypodermic injections.

18. Stout binder pins.

19. A batist apron.

20. A piece of batist 3 feet by 4 feet, to form a mackintosh

on which the patient can lie and in which soiled instruments can be wrapped after use.

21. Soap in a tin. We always carry our own soap. Avoid antiseptic soaps. They do not antisepticize the hands and they make the skin rough. The soap is used for lubricating instruments or gloves. Soap is made by boiling, therefore if the outer surface is washed off, it can safely be used for lubrication.

We do not carry perforating instruments (except sharp-pointed scissors), a decapitating hook, Hegar's dilators, Champetier de Ribes' bag, or special instruments for obstetric operations, as they are very rarely required and can be sent for when needed.

On coming home from a case we always resterilize everything at once, lest an urgent call comes. The instruments are scrubbed with a brush and soap and water. Bozemann's catheters are taken to pieces, cleared and cleaned. The instruments are then boiled and put in the other cases. The batist apron and sheet are scrubbed with brush, soap and water, reboiled, and hung up to dry. The gloves are boiled, dried, and powdered inside and out with baked chalk to prevent them sticking.

In attending a poor patient additional care against dirt is necessary. A clean newspaper on the table is cleaner than a dirty cloth. Carefully cleanse all basins and jugs to be used by rubbing them with wadding soaked in biniodide of mercury. The kettle makes the safest douche can. For a diaper, boil a piece of linen or calico and soak it for fifteen minutes in biniodide of mercury (1–2000).

Rotunda douche and how to use it. The Rotunda douche acts on the principle of a siphon. It is made of stout rubber, so that it may be boiled. An ordinary clean jug is used as douche can. Sink the sinker into the jug and hang the curved metal protector over the edge of the jug. The curved metal protector protects the tube from kinking. Turn on the stopcock. Squeeze the ball chamber and empty it of air. Then pinch the tube below the ball chamber and let go of the ball chamber. The ball chamber fills with douche fluid from the jug. Stop pinching the tube and again

squeeze the ball chamber. This starts a continuous siphon
action. It is well to try it once at home, before using it at
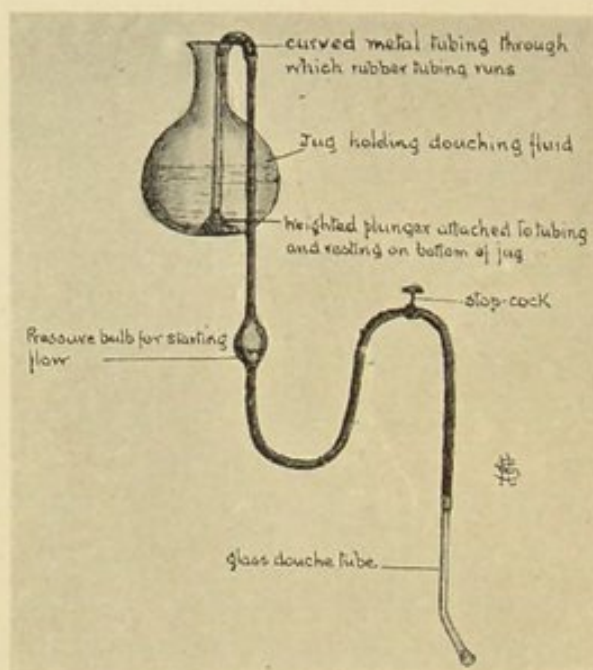
Fig. 18. The Rotunda douche in use.

a case. Its advantages over a douche can, are its lightness
and portability. It costs about 8s. 6d.
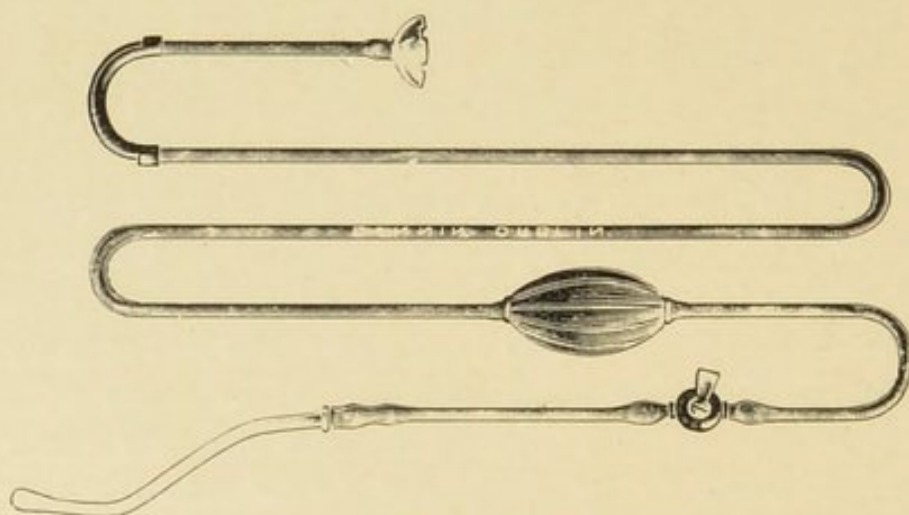
Fig. 18 A. Rotunda douche with glass nozzle.

CHAPTER IV

THE CONDUCTION OF A NORMAL CASE OF LABOUR

The necessity for surgical cleanliness. The cardinal rule for good midwifery is to be scrupulously clean.

We measure our success at the Rotunda Hospital by the number of *morbid* cases we get. The number of deaths is not a good test, for deaths often occur as the result of complications and are not due to want of cleanliness. Also, it is not until we compare figures by thousands that the superiority of the present-day methods assert themselves over past methods, and their superiority is seen to be overwhelming, if our judgement be not based on a death standard alone. That it is not fair to judge of success in midwifery only by the number of cases that die, is well shown by the statistics of the Rotunda Hospital during 1766 and 1780. At that time there was no water supply to the hospital, but all the water was fetched from a pump, adjacent to the hospital cesspool. This cesspool leaked to the extent that it was a cause of complaint by the neighbours and the Master of the time to the public authorities. The patients lay upon beds on straw. Two patients with their babies occupied each bed. Yet, in spite of these conditions, we read in the old reports, that in 1766, with 611 deliveries there were only three deaths, and in 1780 only five deaths out of 919 deliveries. Of course in other years the percentage mortality was far greater than it is now. The morbidity, that is, the rise of temperature, or temperature and pulse above normal, must have been far greater than it is now. For instance—in 1882 clinical thermometers were first introduced into the Rotunda Hospital. The Assistant Master of that time himself took the temperature of 99 cases during their stay of eight days in the hospital. His notebook shows that

no less than 50 per cent. of these cases showed morbidity, nine had temperatures of 105° F., and eighteen temperatures of 103° F. They were not picked cases, and the Master reports the condition of the hospital at that date to have been 'particularly healthy'.

No one nowadays would look upon these cases as successful merely because they left the hospital without dying. Hence success in midwifery is now reckoned by the percentage of morbid cases.

The British Medical Association at Leicester in 1905 laid down as a definition of morbidity that 'a case was to be classified as morbid, if the temperature, taken with a half-minute thermometer for three minutes in the mouth, about the hours of 8 a.m. and 5 p.m., rises twice above 100° F. between or on the second and eighth day of the puerperium.' The temperature of the first twenty-four hours is not taken into account, as during this unstable period the temperature frequently rises, though the cases subsequently are in every way normal.

From 1904–1905, 1904 women were delivered in the Rotunda, with a morbidity, on the B.M.A. scale, of 8·77 per cent. From 1905–1906, 1904 cases were delivered, with a morbidity of 8·43 per cent., or 7·1 per cent., excluding causes of morbidity other than uterine. See Table VIII E, 1905, Appendix. The mortality of these years was 0·31 and 0·42 respectively.

The great improvement shown by these figures over the cases recorded in 1882 is almost entirely due to the modern insistence upon surgical cleanliness in conducting midwifery.

What is meant by a normal labour. In some 90 per cent. of midwifery cases, the child presents by the vertex, and the child and afterbirth are born within twenty-four hours of the onset of labour, without any help to the uterus and without complications.[1]

The nurse. The first business to which you have to attend, when a pregnant woman asks you to conduct her child-birth, is to get a nurse. Probably the patient will choose a nurse recommended to her by some friend. If she does so, we ask our patient to tell the nurse to call on us.

[1] For the mechanism of normal labour see Chapter IX.

We ask the nurse whether she makes vaginal examinations. We have already shown the importance of cleanliness in the conduction of labour, and a vaginal examination made when neither the vulva nor the fingers are properly cleansed is fraught with danger. Septic organisms do not and cannot live in the normal vagina. But they do live on the vulva and they live on unclean fingers. Thus a careless vaginal examination is likely to push dangerous germs into the cervical canal, which is naturally free of them. The danger is comparable to putting a dirty finger into the peritoneum. Therefore, unless you are sure of your nurse, tell her not to make vaginal examinations. For ourselves, we always tell the nurse to refrain from making vaginal examinations. Ask her, if she is a stranger to you, how she is accustomed to wash the patient, to attend to the baby, &c., and tell her, if you differ from her, how you like things done.

We then give the nurse the following list of things to get:—

2 mackintosh sheets for the bed, a yard and a half by a yard.

12 large wood-wool sanitary towels.

3 ounces of chloroform. It is well to take your own chloroform as well.

2 large wood-wool sheets.

50 biniodide of mercury soloids.

4 ounces of creolin or cyllin.

Gamgee tissue and absorbent cotton-wool.

4 binders. A binder should be a yard and a quarter long and three-quarters of a yard wide, and made of strong roller towel material. Women in good position usually prefer the ready-made binders with straps and buckles, obtained from surgical instrument makers.

When to tell the nurse to send for you in a normal case. If the patient falls into labour in the early hours of the morning, tell the nurse to try and get her to sleep, or give her a sleeping-draught. The nurse writes a letter to you before breakfast to tell you that labour has started, or she sends earlier, if the patient does not sleep and pains are getting frequent. The nurse herself should write, telling you the nature of the pains, the temperature and pulse, or any other

notable fact. This is better than a verbal message from an excited husband. If the patient falls into labour during the day and she sends for you, it is better to go round and make an abdominal examination, and see that she is in labour and that the lie of the child is correct. This is very important, for it is essential to know as early as possible if anything is wrong, so that you may be prepared.

How to tell that the patient is in labour. The signs that labour has set in are four : (1) the contractions of the uterus are painful, and the pain is generally in the back; (2) the head in a multipara is fixed between the pains; (3) the show; (4) the dilatation of the internal os.

The pains. The uterus contracts intermittently throughout pregnancy. When labour sets in, the patient becomes aware of these contractions, from the pain they cause her. The transition may be gradual or abrupt. It is usually gradual, for they are preceded by vague pains of a non-intermittent character in the abdomen.

To detect whether the contractions are painful, if your patient is not in bed, ask her to go to bed. Then lay your hands on the uterus, and note when the uterus hardens. Ask her to tell you when she feels the pains, but do not ask a leading question when the uterus is hard. If the uterus hardens and she tells you she has a pain in her back at the same time, she is almost certainly in labour.

Fixing of the head in a multipara between the pains. This sign is of no use for primiparae, for in them the head fixes some three weeks before labour. But when the head is found to be fixed between the pains in a multipara, she is in labour. On the other hand the converse is not true, for in
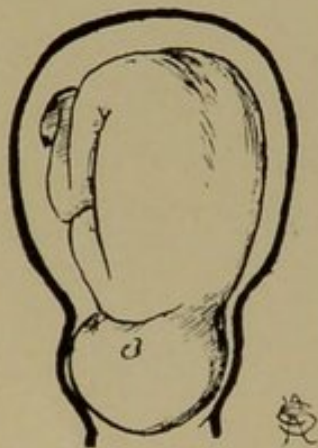
FIG. 19. Diagram to show the fixing of the head by the lower uterine segment.

abnormal cases the head may not fix, although the patient is in labour. By 'fixing of the head' is meant that when you catch the head by Pawlik's grip (which will soon be described), you cannot move it from side to side, or can only just move

it a trifle. The reason is that the lower uterine segment is firmly contracted round the head, and keeps it steady. The head by 'engaging' in the brim reaches the lower part of the lower uterine segment, which lies a little below the level of the brim. If you can freely move the head, and the contractions are not painful, you can be sure the patient is not in labour.
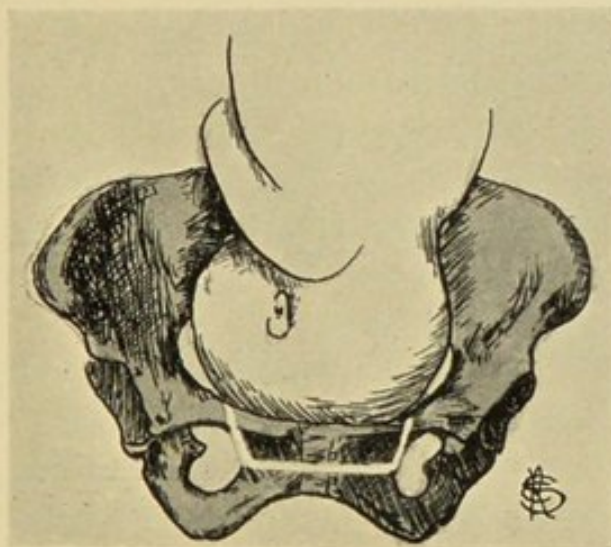
Fig. 20.   Diagram to show how the lower part of the
        lower uterine segment (shown by white line) lies
        below the level of the brim of the pelvis.

The show. Turn the woman on her left side, and look at the vulva. If a blood-stained mucus discharge is hanging about the vulva and vulval hair, you can be sure that the woman is in labour. Its absence, however, does not show that she is not in labour.

If you are not sure whether the woman is in labour or not, you will have to make a vaginal examination to see if *the internal os is dilated.*

Cleanliness is so essential, to make a vaginal examination safe to the patient, that it is necessary to describe in detail the precautions taken.

Preparations for making a vaginal examination. Three basins are needed, and these are scrubbed inside and out by the nurse before the doctor comes. The jugs must be equally clean. One basin is for soap and water, the second for plain

water in which to rinse the hands, and the third for mercuric
iodide solution (1–1000). We take a scrubbing-brush and
a pair of rubber gloves in a batist bag, and these are boiled
for five minutes in a saucepan on the fire, then the gloves
and brush are upset from the bag into the basin containing
mercuric iodide. You roll up your shirt-sleeves, take the
brush out of the mercuric iodide, and scrub your hands with
soap and water for four minutes. It is most important that
the brush should be boiled, for an unboiled brush is often
more dangerous than no brush at all, according to bacterio-
logical research. Pay especial attention to the nails and
spaces between the fingers. Rinse away the soap in the
basin of clean water, for soap destroys the action of mercuric
iodide. Soak the hands for one minute in mercuric iodide.
Put a glove on the right hand.

Then pass your left hand over the patient's left thigh and
between the legs to the vulva. Lift the right labium minus
up with the fingers of the left hand. You have now exposed
the muco-cutaneous surfaces of the labia minora, which guard
the entrance to the vagina. On these surfaces septic microbes
are found, therefore they want careful cleansing. Wipe
them from before backwards with six pieces of the wool
which are saturated with thick, soapy water, and then with
twelve pieces of wool which have been soaking for ten
minutes in a small dish (soap dish) of mercuric biniodide
(1–1000), and lay a piece of biniodide-soaked wool between
the lips for a few seconds. The first few biniodide-soaked
pieces of wool wash away the soap; the others act as dis-
infectants. This soaking and sponging of the labia minora
with mercuric iodide is the best sterilization you can do, for
you cannot scrub the labia. Then holding the right labium
well open, so that your fingers touch only these cleansed
muco-cutaneous surfaces, pass the index, or index and middle
finger into the vagina.

What to feel at a normal case. You will feel that the
vagina is freely lubricated, and if labour has started the
secretion is blood-stained owing to the slight bleeding caused
by separation of the membranes that covered the internal os.
This is the 'show'. Feel if the rectum is empty. Then feel

for the os. The opened os in a primipara is a circular opening with its edge flattened out on the advancing part. The
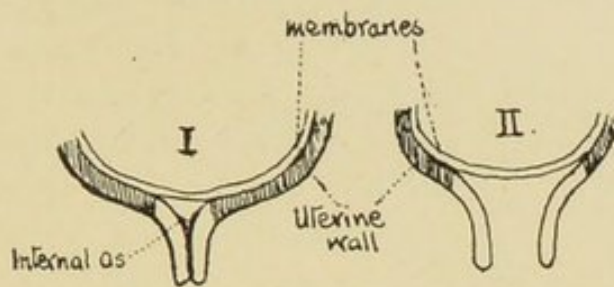
FIG. 21. Diagram to show detachment of membranes when the os begins
to open.

opened os in a multipara has a short canal in early labour. The illustrations show this. The reason is that the internal
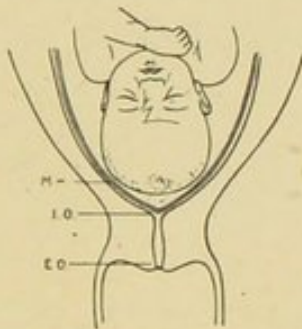
FIG. 22. The closed cervical canal before the commencement of labour. M, membranes; I O., internal os; E.O., external os.
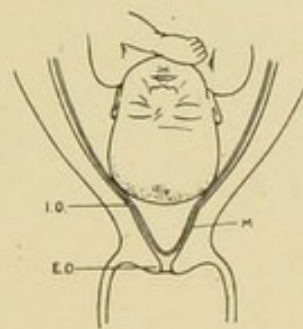
FIG. 23. The cervical canal of a primipara opening.

os opens before the external in the primipara, but not in a multipara, for the connective tissue that closed the external os
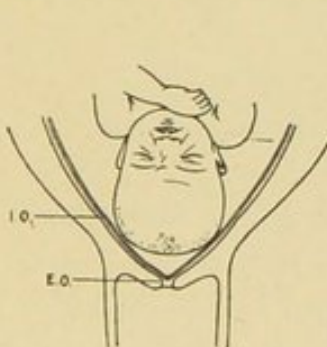
FIG. 24. Further stage of the opening of the cervical canal of a primipara.
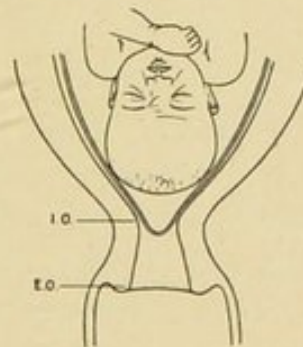
FIG. 25. The cervical canal of a multipara opening.

has been torn in the first labour. Indeed, in a multipara you can often get your finger into the cervical canal in the later

months of pregnancy, although the internal os is closed. If the internal os is opened in a primipara so as to allow one

finger to touch the bag of membranes and the head, and there is no hydramnios, labour has begun. In a multipara, labour has very probably but not necessarily begun. At the same time feel the presenting part. In a normal case it is the head, and you feel it easily, for the head is engaged in the lower uterine segment. You can be quite sure it is the
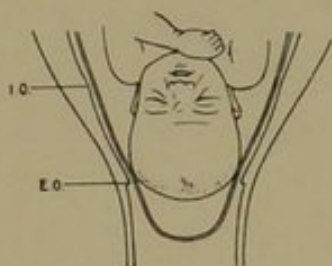
FIG. 26. Cervical canal fully opened.

head, if you feel a suture. Feel a suture on a new-born baby's head, and you will readily recognize a suture of an unborn foetal head. Sometimes the breech feels as hard as the head, but you feel no suture. You can, if you like, try to make out the lie of the child by vaginal examination, though it is better to do this by abdominal palpation. The
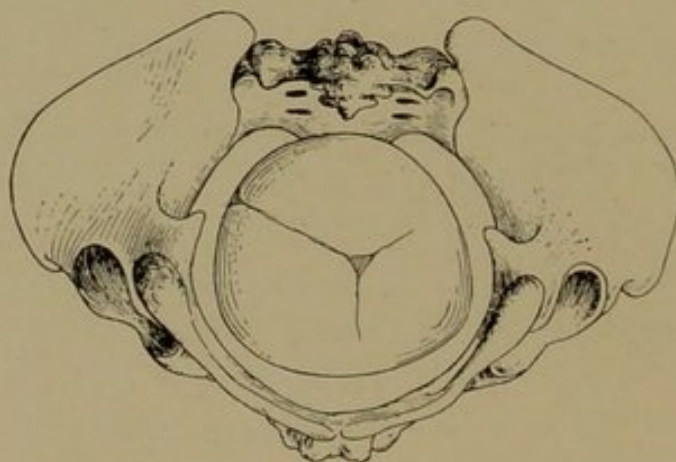
FIG. 27. Vertex II as felt by vaginal examination.

posterior fontanelle, told by feeling the point where three sutures meet, is the guide to the lie. It is forward and to the left in vertex I, forward and to the right in vertex II, posterior and to the right in vertex III, posterior and to the left in vertex IV. But this discovery by vaginal examination of the lie is not important, nor is it easy through a small os, for the left lateral position is confusing. If you feel the head easily, you can be content that the baby is lying properly. You

also want to discover if the membranes have ruptured. It is not easy to feel them with gloved fingers, unless there is a pain. When there is a pain the contracting uterus
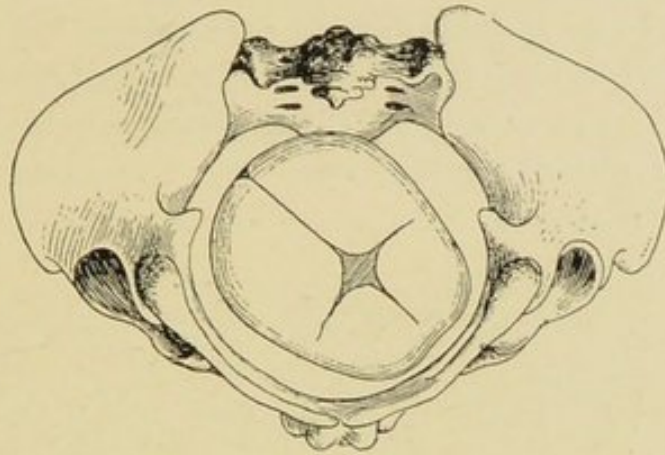
Fig. 28. Vertex IV as felt by vaginal examination.

presses on the liquor amnii, and the membranes bulge like a convex watch-glass. Therefore, rub the uterus up with the left hand to make it contract. Finally, make an estimate
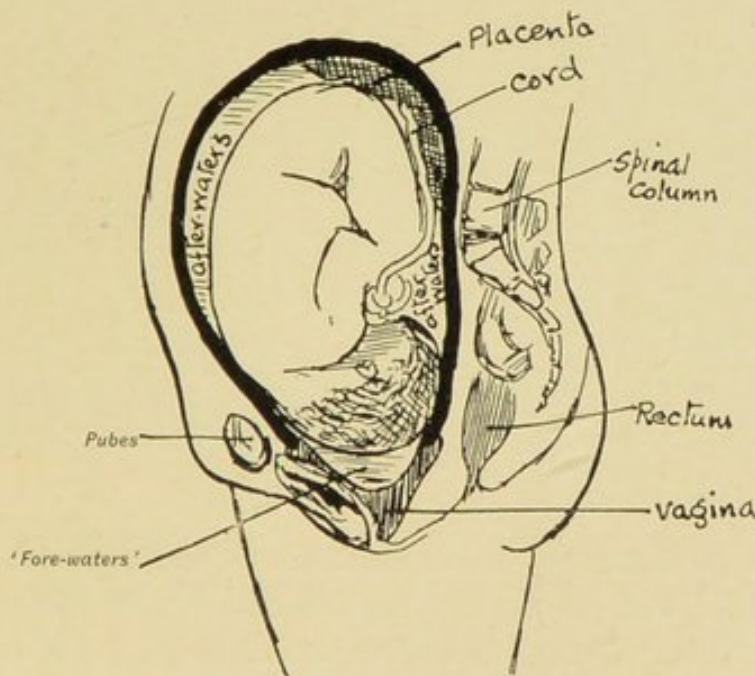
Fig. 29. Diagram of the 'fore-waters', bulging with a pain.

as to how many fingers breadth the os is, if it is open. If the os is full, the head down, and the membranes unruptured, scratch through the latter with a boiled catheter's stylet or

your finger. You know that the os is opened fully when you cannot feel its edge at all, anteriorly or posteriorly. It is completely drawn up over the presenting part. You have learnt, then, from the vaginal examination, if the head is presenting, if the membranes are unruptured, if the internal os is open, and its size, if it is open. Its size gives you a clue to the degree of advance of the first stage, for the first stage of labour is from the initial opening of the closed internal os to its full dilatation.
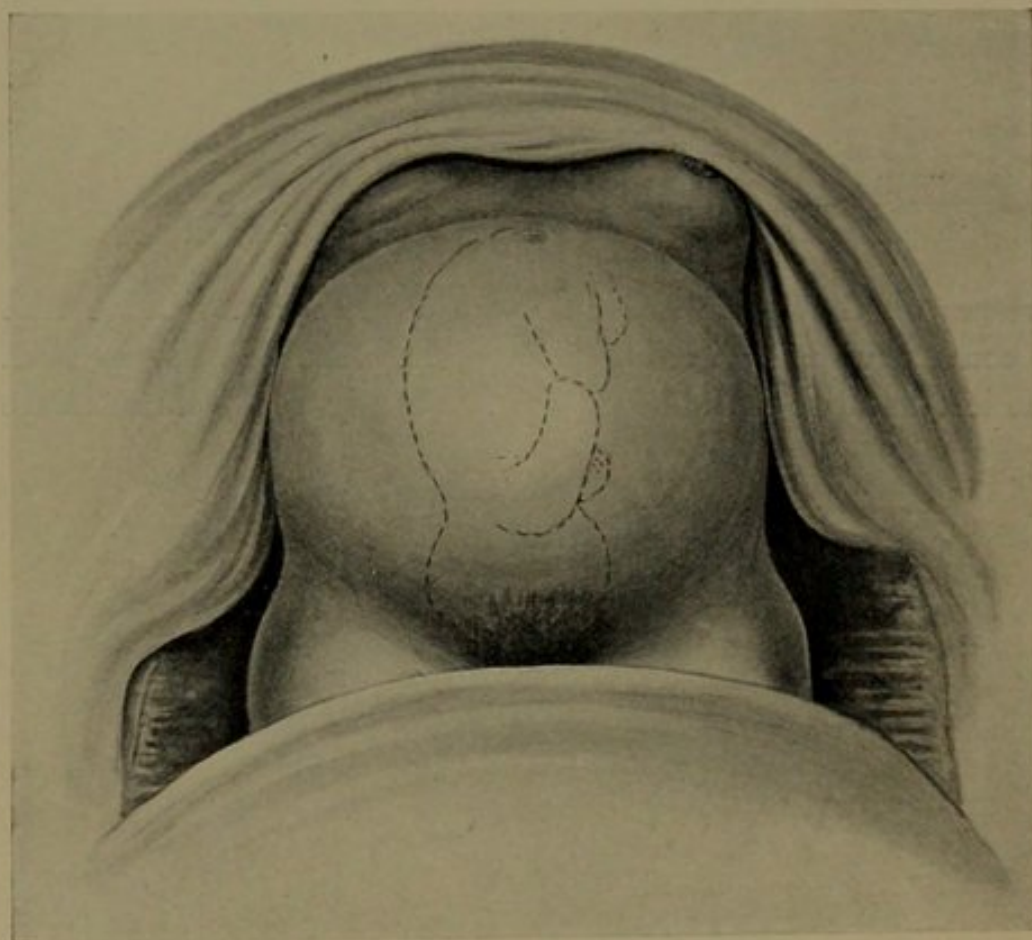
Fig. 30. Vertex II as felt by abdominal palpation.

You next proceed to make an abdominal examination to discover the lie of the child. In nearly all cases in private we dispense with vaginal examinations, and find out if the patient is in labour, the lie of the child and the progress of labour, by abdominal palpation. With practice, it is quite easy to do this in the great majority of cases. We strongly recommend the conduction of normal labour without vaginal examinations. If you omit the vaginal examination, do not

omit cleansing of the external genitalia before the birth of the child.

Abdominal examination. Ask your patient to lie on her back. Then sit on the side by her bed, facing her. Fold some clothes over her chest, for this prevents her watching your hands and takes away her attention from the examination. See if the bladder is full and if so, ask your patient to pass her water, or pass a catheter. It is well to tell the nurse to get her to pass her water before your arrival. Then
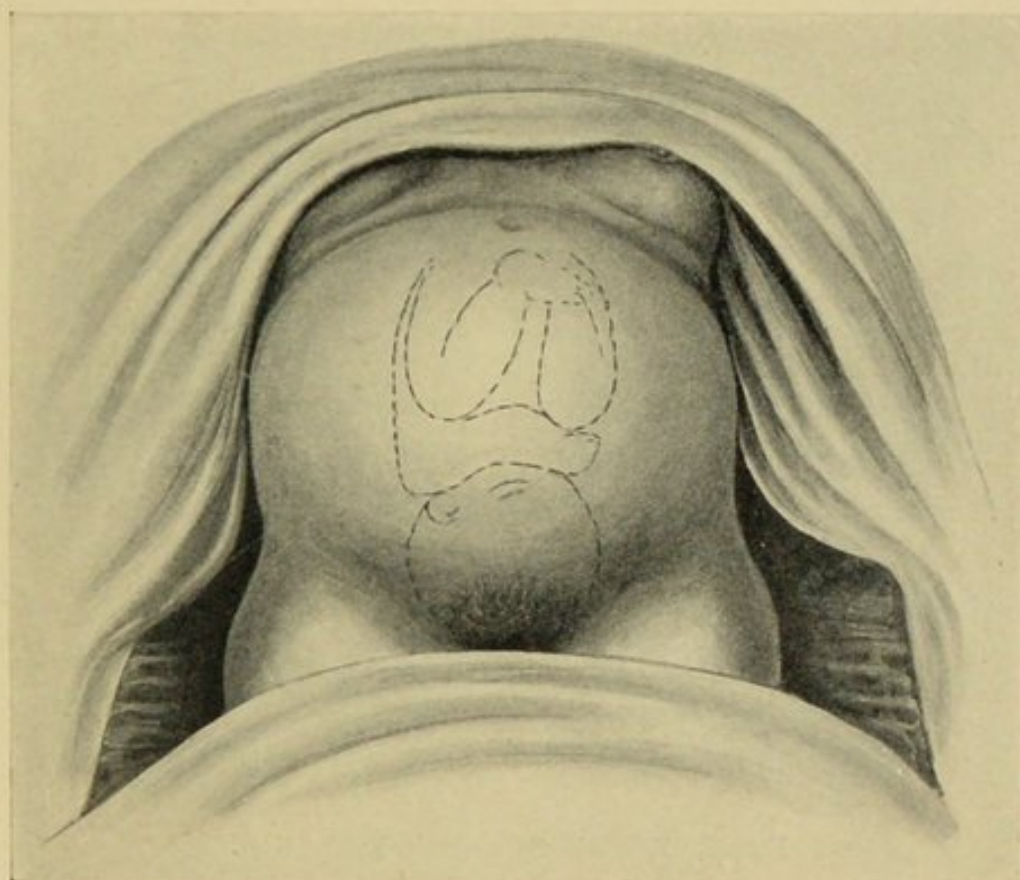
FIG. 31. Vertex III as felt by abdominal palpation.

lay the palms of your hands on the abdomen and gently dip the fingers into the abdomen, gradually accustoming the abdominal muscles to their play. In abdominal palpation four methodical grips are described. They are: (1) the fundal; (2) the umbilical; (3) Pawlik's; (4) the pelvic. The word 'grip' is not a good one by which to describe them, for, except Pawlik's, gentle palpation is better than gripping.

1, 2. **Fundal and umbilical palpation.** Sit facing your patient and palpate the fundus between the pains. In

a normal case the breech of the child is at the fundus. You can tell it is the breech, because when you move it the child's body moves with it, because there is no groove between but it is continuous with the child's back. You may also feel the knobs of the feet or knees in the lateral fundal parts. You may feel or see them move, and the patient may feel a kick at the same time. Foetal movements indicate the position of the breech. Passing your hands down to the level of the umbilicus you will feel the smooth resisting back, if the child's

Fig. 32. Fundal and umbilical palpation.

back is turned towards you, as it usually is. If you are in doubt about it, fit the palm of one hand over the fundus like a cap and press the child's breech down. This causes the back to bulge forwards a little, because the body bends and you can feel the resistance of the back by 'dipping' your finger-pads in passing them from one side of the uterus to the other. Or again, you can press down on one side of the uterus with one flattened hand and you will displace the child to the other side and make the back more prominent and easier to feel. On the opposite side to the back, you may

feel the knobs of the child's limbs, which slip away from the fingers.

Sometimes in normal cases the back is behind and the limbs to the front, in which case you feel the limbs easily in front and on both sides of the middle line. Your fingers, instead of meeting with the resisting back, dip into the hollow made by the flexed body. If you cross your arms on your chest flex your thighs on your abdomen and bend forward, you will understand how this is.
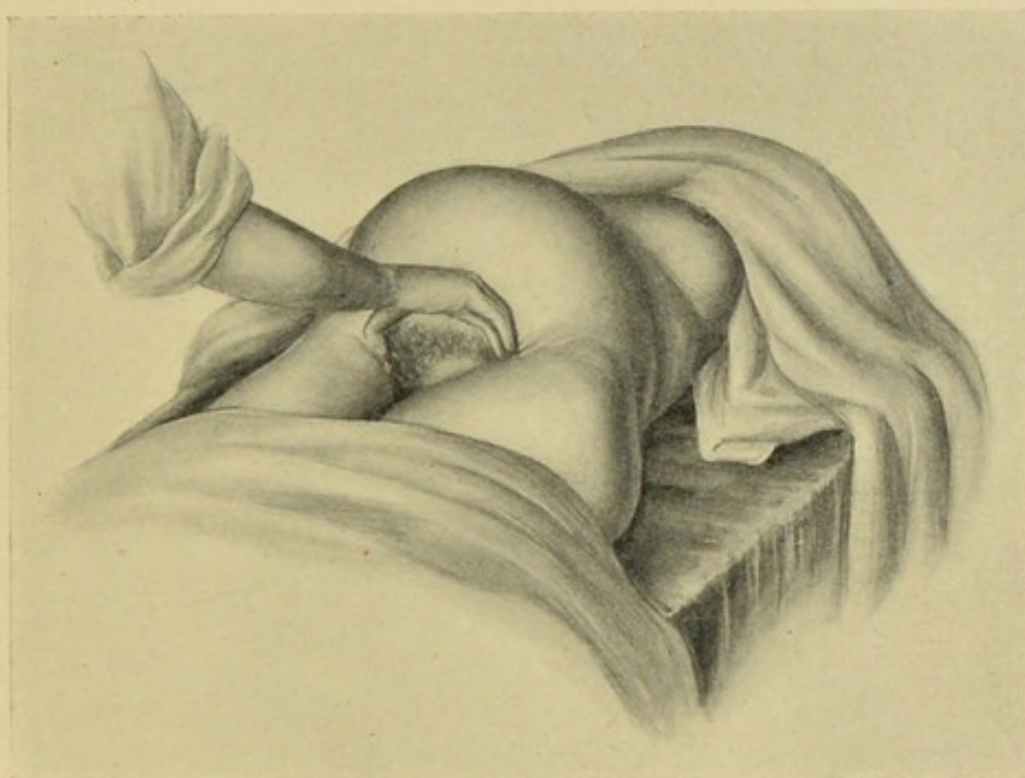
Fig. 33. Pawlik's grip.

3. **Pawlik's grip.** Pawlik's grip is a very useful grip indeed. The illustration shows how you catch the presenting part, in normal cases the head, with your fingers. It is the same grip as you would use in gripping a man by the throat. Sit facing the patient. The thumb on one side and the fingers on the other are sunk down on either side of the head. The head is seized in this way, but although the eventual grip is a firm one, the pressure must be gradual or the patient will resist. If, when you hold the head in this way, you cannot move it from side to side in the absence of a contraction, it is fixed and this fixing is a sign of labour in multiparae,

but it occurs about three weeks before full term in primiparae. Now you can tell more by Pawlik's grip. The child's head is flexed, as it passes through the pelvic brim into the pelvic cavity. The result of this flexing is that the prominent forehead is felt higher up abdominally and more readily than the sloping occiput. Flex your own head and feel it, and you will see that this is so. So that by Pawlik's grip you can tell how much flexed the child's head is, and confirm the diagnosis of the position. You can also tell how much of the head is above the pelvic brim and has not entered the pelvic cavity. If the whole head has entered the pelvic cavity, you only dip into the groove formed by the neck, and you would think by Pawlik's grip that there is no presenting part. You then use the fourth, or pelvic, grip.

Fig. 34. Pelvic palpation.

4. **Pelvic palpation.** This time you sit or stand with your back to the patient's face. The two hands with fingers extended are pressed gently down on either side of the pelvic cavity. You can feel the head in this way until it is almost down to the perineum. The child's forehead fills up its own side of the pelvic cavity more than the occiput, and so you get

confirmation of the position. You can also watch the advance of the child, by noting how much more the head has sunk in the pelvic cavity between two examinations.

Listening for the foetal heart. Lastly, listen for the foetal heart, either with a phonendoscope or by applying your ear directly to the patient's abdomen. It is best heard on the side to which the back is turned, below the level of the umbilicus. It beats between 120 and 160 to the minute, except during a pain, when it may slow down to 80 per minute.

Information now gained. You are now in possession of some very useful information with regard to your patient. You know whether she is at full term and whether she is in labour. You know that the child is lying normally and is alive. You can make a fair guess at the stage of labour by the amount of flexion there is of the head and how far it has sunk into the pelvic cavity. If your patient has had pains whilst you were attending to her, you notice by Pawlik's or the fourth grip whether the head has advanced. If you have made a vaginal examination you know the size of the os and whether the membranes are intact. By asking the nurse, if you make no vaginal examination, you can find out if the waters have broken. You also find out how frequent and strong the pains are, whether the bladder and bowel are empty, and you ask your patient as to whether she was quick or slow with previous labours, if she is a multipara. Remember, a full bladder or full rectum are the only obstructions to a normal labour.

When it is safe and when it is unsafe to leave the patient. One of the trials of the obstetrician is the difficulty of predicting the probable progress of labour. Mistakes are certain to occur in every practice. The baby is born soon after you leave and you get the blame. At the same time, you cannot wait with a patient, who may be two or three days in labour.

The chief things on which you decide are the character of previous labours, the nature of pains (remember a doctor's entrance often frightens away the pains), their force and frequency, the position of the head in the pelvis and whether

the membranes have broken. If the head is sunk in the pelvic cavity, as told by Pawlik's and the pelvic grip, it is not safe to leave. If the waters have broken, you should not leave. If, after waiting some time, you are in doubt as to progress, it is better to make a vaginal examination to discover the size of the os and discover whether the patient is in the second stage or not. The average duration of the first stage of labour, that is, from the beginning of the opening of the internal os by painful contractions to its full dilatation, is in primiparae about twelve hours, but it may range from under six hours to over twenty-four. In multiparae it averages about six hours. Consequently, if in a multipara labour has started with good pains, it is better to stay, or at any rate not go far away. With a primipara, on the other hand, there is not the same necessity. You should never leave a patient in the second stage, that is, after full dilatation of the os; but if the os is not full in a primipara, it is usually safe to leave. If you leave, tell the nurse when to send for you.

When the nurse should send for the doctor.

1. If the waters break.

2. When the second stage pains begin. The pains of the second stage are characterized by the patient's bearing down with them. She gets red in the face from this, she sweats and her pulse quickens during the pains. They last longer, come more frequently, and are more painful than the pains of the first stage. A practised nurse can nearly always tell them from the shorter, less violent, and longer intervalled pains of the first stage.

3. If any signs of 'pressure' appear, that is, if the perineum begins to bulge at all with the pains, or if faeces are pressed out of the anus with the pains.

If you stay, wait downstairs until the second stage has begun, else the patient may begin worrying for chloroform. Chloroform is bad for a patient in the first stage, for it tends to drive away the pains.

Enemas. Preparation of the bed. Whilst you are away, or waiting downstairs, the nurse, who has given her patient a purge at the beginning of labour, gives her an enema, if the purge has not acted. It is necessary to have the rectum

empty to avoid the risk of bacillus coli getting into the vulva and vagina from faeces expressed as the head is born. Many cases of sepsis are due to the bacillus coli.

The patient should walk about in the first stage, if possible. If the nurse has not already arranged the bed, she does so now. We are accustomed to arrange it in the following order from below upwards :—

1 A hard mattress.
2. Blanket.
3. Sheet.
4. Mackintosh.
5. Draw-sheet or wood-wool sheet.

        These are all tucked in under the mattress.

6. The binder laid out.
7. A second mackintosh overhanging the edge of the bed, so as to protect the underlying clothes.
8. Draw-sheet, which must be loose and not fastened by safety pins.

The patient is confined on the draw-sheet. After delivery, she is washed and cleaned up. The draw-sheet and upper mackintosh are then withdrawn and the patient lies on the binder and the wood-wool sheet. A narrow bed, to which there is access on both sides, is much more convenient than a large bed. A large tin bath is put under the bed to catch any blood and liquor amnii, and save the carpet from getting soiled. You can also save the carpet by laying down a piece of oilcloth over it. The amount of clothes that are to cover the woman is arranged according to the temperature of the room. The nurse pins all their edges together with binder pins. They can then be all lifted off at one time and the woman quickly exposed, if need arises.

Preparation of the room. The nurse empties the basins, except that containing the mercuric iodide. She sees that there is plenty of hot water and a kettle on the fire. She gets a small table, or something on which a chair can stand, so that if a douche is needed in an emergency the stand for it is ready. A small basin is needed for the afterbirth. A tray or dish is needed for instruments; if not available, they can be put in the basin with the plain water.

The second stage. See that the room is arranged as you wish, that you have your douche ready except for the addition of the hot water from the kettle in case there is haemorrhage. This is a precaution always worth taking. We carry the Rotunda douche with vaginal nozzle ready boiled, so that we only have to take it out of the bag, if it is needed.

You have two pairs of boiled rubber gloves in the basin with biniodide of mercury solution and the ligature for the child's cord. In the basin with plain water, you have your nail brush, a Spencer-Wells forceps in case you want to clip and tie the cord at once, if the child is in white asphyxia, and a pair of scissors for cutting the cord; also strips of clean linen for the child's mouth and eyes. You get out the chloroform mask, if your patient asks for chloroform, and take note of any other instruments you may need.

You now know where everything is, so that if an emergency arises you will be able to set to work coolly and deliberately, without confusion. But it is well to set about these preparations quietly, for a clatter of instruments is apt to frighten patients.

The position for the second stage. The left lateral position is the common one. It leads to less exposure and is warmer than the position on the back. It is easier to deliver a child single-handed, when its mother lies in the left lateral position. If the second stage is tedious, she may lie on her back, for, as Smellie says, 'in this position the weight of the waters, and, after the membranes are broke, that of the child's head will gravitate downwards, and assist in opening the parts, while the contracting force of the abdominal muscles and uterus is more free, strong, and equal in this than in any other attitude.'

How to make the patient bear down effectively. If the patient does not want chloroform, the child will be born much more quickly if she bears down properly during the second stage. To make her bear down, put her on her left side. Tie a roller towel or rope to the end of the bed. Put a foot cushion or stool against the end of the bed, against which she can put her feet when she has a pain and down the side of which she can put her legs when she has no pain, and thus

avoid cramp. When she has a pain, she flexes her legs and
puts her feet against the cushion. She pulls on the roller
towel and keeps her mouth closed. You press your knee into
her back. She thus gets far better power to bear down, than
if she is left to herself. You may also assist by pressing on
the fundus during a pain, but sometimes this hurts her and
you have to desist. Sometimes, however, pressure on the
fundus will save the necessity of forceps.

When to give chloroform. If your patient asks for
chloroform, she should have it when pressure signs arise.
The perineum bulges with each pain, which shows that the
head is well down, and the lips of the vulva open a little. The
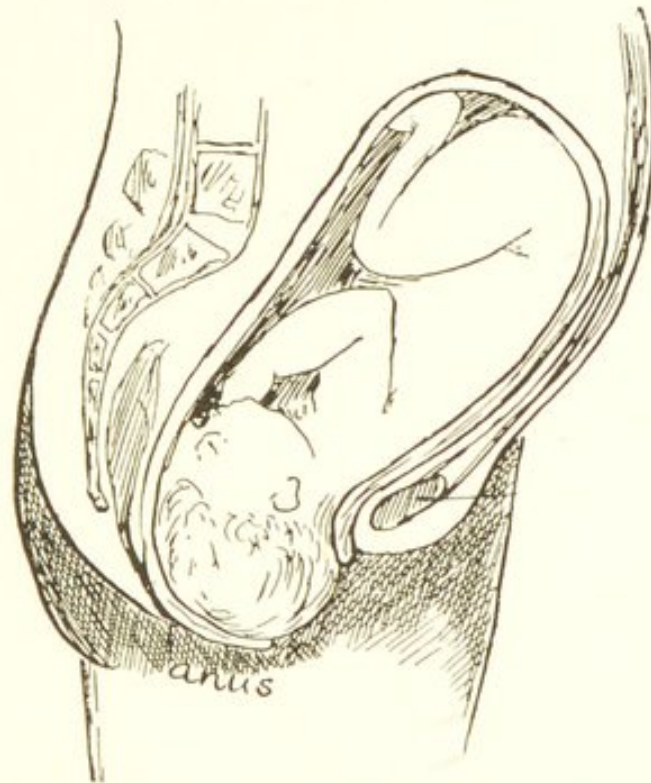
Fig. 35. Diagram of the head on the perineum.

anus is protruded. You can feel the head between the pains
by pressing the fingers up between the anus and the coccyx.

How to give chloroform. We use a Skinner's mask. The
patient holds it over her face and we drop chloroform on it at
the beginning of each pain. The patient lets it fall from her
hands when she is sufficiently bemused. Or you can keep
her chattering and rambling until the head is just going to be

born, when more chloroform should be given to prevent her kicking.

There is no danger in giving light chloroform anaesthesia to a woman in labour.

How to watch the progress of the head. You can watch it by palpating the head by the pelvic grip. If the head is too far down to be reached by this grip you can reach it by pressing the fingers up between the coccyx and anus.

Is it necessary to make a vaginal examination, when the waters break? If the head was fixed before rupture there is no need. If it was not fixed, do so for fear the cord has prolapsed.

Is it necessary to rupture the membranes? If, when you make a vaginal examination, you find the head is in the pelvic
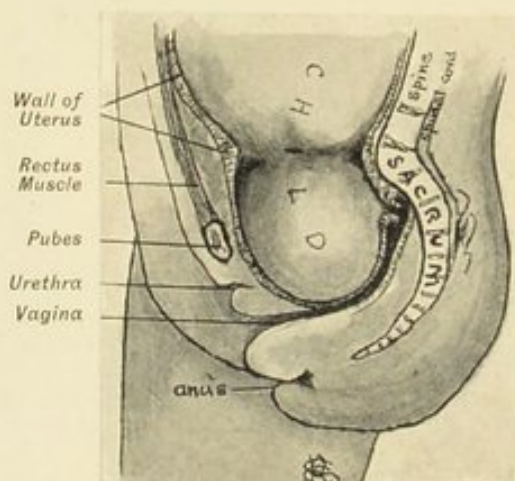
Fig. 36. Diagram to show thinning of the anterior lip of the cervix.

cavity and the os fully or nearly fully dilated, take a boiled catheter stylet and scratch through the membranes. But it is not necessary to make a vaginal examination especially to do this. At times the anterior lip of the cervix is stretched and thinned out over the presenting head, although the latter is near the vulva. So thin is it that mistakes are constantly being made, and this condition mistaken for full dilatation of the os. You can with care always feel the os high up, posteriorly in the vagina.

Importance of attempting to save the perineum and recognizing even small tears of the perineum. Next to sepsis,

an unmended or undiscovered tear of the perineum is the only harm that can well happen to a woman who has a normal child-birth.

The child's head is driven down by the abdominal muscles and the uterus. It is directed forward through the vulval orifice by the levator ani. The levator ani is a muscle which pushes the pelvic organs upwards and forwards. It runs obliquely across the pelvis and slings up the pelvic organs with the help of the pelvic fascia. If the levator ani
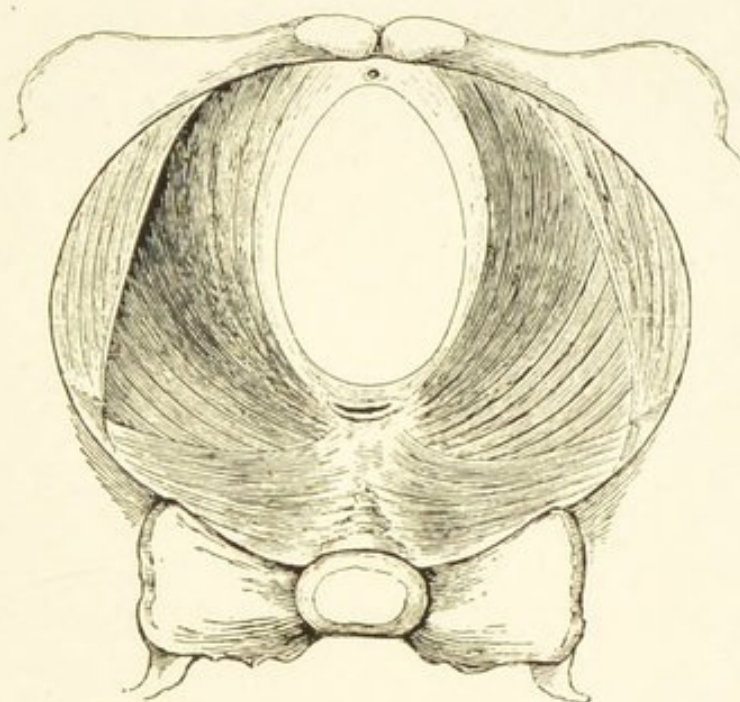
Fig. 37. The pelvic floor from above.

and pelvic fascia are ruptured, this sling to, or floor for, the pelvic organs is weakened, and, owing to the upright position of the female, prolapse of her pelvic organs is very likely to gradually follow. Gynaecologists and obstetricians are nowadays agreed upon the necessity of doing your best for your patient by suturing every tear of the perineum, other than laceration of the mucous membrane of the fourchette.

It is seen that to some extent the uterus and levator ani antagonize each other. The uterus pushes the head down; the levator ani, upwards and forwards. The action of the levator ani can readily be seen in the receding of the head from the

vulva, when the uterine contraction has passed off. The uterus clearly has the better of the contest, for the levator ani is weakened by being stretched over the advancing head. Consequently, if the uterus is strong, the head large, or the parts unrelaxed as in a primipara, a rupture of the levator ani is very likely to occur. The perineum practically always tears with the levator ani, but the levator ani may be badly lacerated, although the perineum is only slightly torn. The importance of recognizing this tear is great from the patient's point of view. A neglected tear may lead to cystocele, rectocele, retroversion, prolapse, and all their attendant evils.

A method of ' saving ' the perineum. As has been said, obstetricians are agreed on the desirability of saving the perineum, but they are not agreed as to a method of doing so. In fact, one has a right to be sceptical about 'saving' the perineum.

Our method at the Rotunda Hospital is based on the following rationale. The flexed head is pushed by the uterus down to the perineum. Between the pains the levator ani pushes the foetal occiput up against the pubes. When the occiput is under the pubic arch, the levator ani pushes the head forward and it is delivered by extension. It is the action of pushing the head forwards against the pubes we try to assist.

To follow the present Rotunda method, stand facing the patient's feet. Pass your left hand between the thighs from in front. The right is held free. Both hands are gloved. The thighs must not be widely separated, for this stretches the perineum. The fingers of the left hand are then placed on the foetal head and press the head against the pubes. They cannot do much, but what little they can do may be good. They will not cause extension, for the levator ani is doing the same thing and extension will not take place until the proper time.

But if the uterus is pounding the head violently down on the perineum and overcoming the levator ani, you can do good. You can resist the violence of the uterus and press against the head's advance during a pain. You cannot stop

the advance, but you help to save the suddenly stretched levator ani.

We do not recommend either direct pressure on the perineum or episiotomy. Direct pressure seems apt to determine the tear and excites more powerful uterine action. By episiotomy is meant cutting the perineum with scissors and so anticipating a tear you think will take place. You cannot be sure whether the perineum is going to tear or not, and if it does
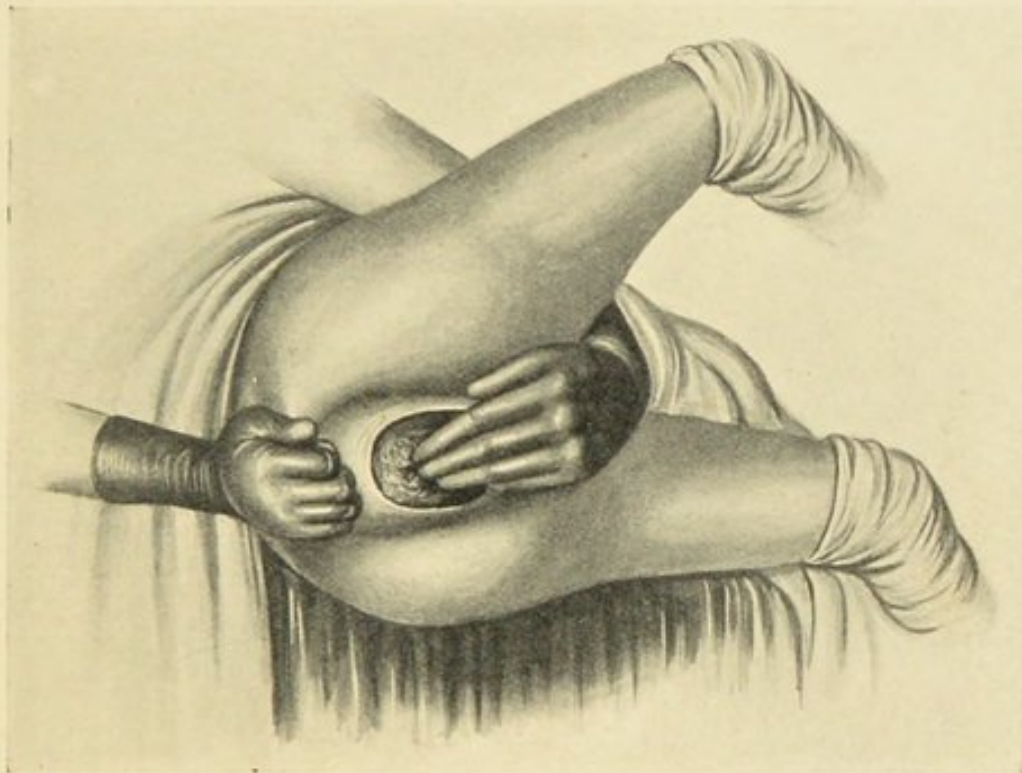
Fig. 38. Saving the perineum.

tear, if stitched, it will heal up as well as a cut with the scissors.

So much for our method, yet in spite of its adoption in the hospital 50 per cent. of our primiparae get torn perineums to a greater or less extent, and have to be stitched. Most of these cases, are, however, attended by students and probationers without much experience.

When the head is born. First see if the cord is round the child's neck. Do not push two fingers into the vagina, but pull the child's head down a little and you in no way risk soiling the vulva. If the cord is round the neck it will be seen. Pull down a loop of it and pass it over the head. If the

shoulders are being born, it can be slipped over the shoulders. If it is so tight that you cannot do this, you must cut the cord with scissors and deliver the child quickly. A cord so tightly pressed upon will not bleed whilst the child is being delivered. Still, if you can, put a pair of Spencer-Wells forceps on to the proximal end or hold it between your fingers.

FIG. 39. Pulling down a loop of cord that is round the baby's neck.

Care of mouth and eyes. There may be much mucus in the mouth of a child. Its first breath is inspiratory and it may choke itself with mucus. Therefore wipe out the child's mouth with a piece of soft linen, when the head is born. With more linen carefully wipe the eyes from the inner canthus outwards to free them of possible vaginal discharge.

Birth of the shoulders. The birth of the shoulders is brought about naturally by the pain that succeeds the one that pushed out the child's head. It is quite safe to wait for this pain, unless the child's head gets very blue or the face has convulsive twitchings. The placental circulation has not stopped and the child also often takes short breaths. If the

child's head gets very blue, rub up the fundus of the uterus to a contraction and deliver the shoulders by pressure on the fundus. Should this be unsuccessful, pass a finger into the vagina, hook it under the anterior armpit and pull the shoulder down under the pubic arch.

It is unwise to pull on the head to deliver the shoulders, unless you are absolutely sure of the position, or watch very carefully how the child's head is going to twist. The reason of this will be explained under the mechanism of impacted shoulders, which does not belong to normal labour.

Delivery of the body and legs. This is brought about by the same contraction that delivers the shoulders. Whilst the shoulders are being born, catch the child's head with your hands and guide it up towards the abdomen of the mother.

When the child is born, turn the mother on her back and let the child lie between her flexed thighs. In private practice we wait for a few minutes for the blood and liquor amnii to drain away, and thus avoid messing the bed. The third stage of labour, namely the delivery of the afterbirth, has now begun.

The third stage. Now turn the woman on her back near the edge of the bed, so that only the side of the bed gets soiled. It is easy to turn her by passing your arm under her bent knees. Be careful, when she is being turned, that she does not kick the baby. She is especially apt to do this, if she is dazed with chloroform.

Advantages of the position on the back. It is the most convenient position for the obstetrician, for he can control the uterus better when the patient is lying on her back.

It prevents air being aspirated into the uterus. The heavy uterus falls over to the left side after delivery of the child and air rushes in. Air embolus might result, or saprophytes might get aspirated into the uterus. There is no real proof that either happens, but at any rate they are avoided by the position on the back.

The mother has lost a lot of heat during delivery, and if she is not covered she will shiver. Therefore the room must be warm and she must be covered by a blanket. The clothes should cover her chest, abdomen, and lower limbs. If she

bends up her knees, she will save the clothes from being soiled.

See, again, that everything is ready in case of a sudden rush of blood. Run through in your mind the way in which you would set to work, should post-partum haemorrhage occur. For example, the douche can or jug is resting on a chair and there is space on a table near the patient, on which the chair can stand. The hypodermic syringe, with a small bottle of brandy or ether, is on the mantelpiece. Rubber gloves are in the basin. The sterile case containing a catheter, a vaginal nozzle, and a Bozemann's catheter and perineal needles and needle-holder, and the bag with the Rotunda douche, if this is used, are near at hand. There is cold water in the jug and a kettle with boiling water on the hob. Thus everything is ready, and if bleeding occurs you can set to work deliberately, without unnecessarily alarming your patient.
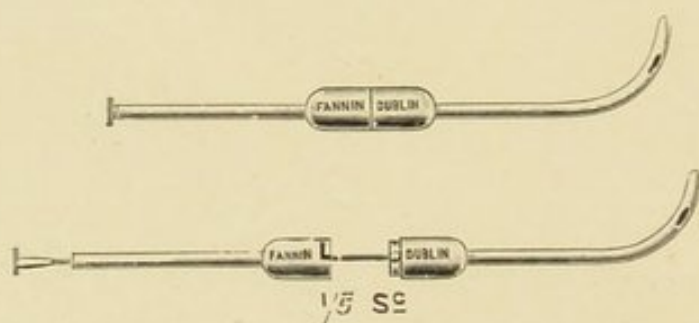
FIG. 40. Carton's catheter, closed for use and opened for cleaning.

Attention to the child. As long as the cord pulsates well, the child is getting oxygen. The child may be blue. If so, hold it up by the legs and slap its back. The first breath is inspiratory. Holding the child up by its legs makes the mucus run out of the throat. It is well to again wipe its mouth out with soft linen, before making it breathe. You can suck the mucus out by a catheter. At the Rotunda we use a catheter devised by Carton (late Assistant Master), which, by means of a reservoir, prevents you sucking the mucus into your own mouth. A few slaps or a little cold water will make the child cry.

When to tie and cut the cord. Experiments have shown that if the cord is cut as soon as the baby is born, the baby

loses three ounces of blood, which remain in the placenta, instead of being sucked along the umbilical vein. They have also shown that babies who have their cords cut at once do not thrive so well as those that have their cords cut when pulsation has ceased, owing to the loss the former sustain. Therefore do not cut the cord until all pulsation has ceased.

Take the ligatures from the biniodide of mercury solution and tie the cord in two places with reef knots; wet ligatures are firmer. Cut with sterile scissors between the ligatures. A ligature at the placental end of the cord is not essential, but saves mess and becomes essential if there is a twin in the uterus. The second ligature should be tied on a gently stretched cord about three inches from the vulva. Give the child to the nurse when the cord is cut, and see that the cut end does not bleed.

Control of the uterus. Although control of the uterus is not necessary in a normal case, the present teaching of the Rotunda Hospital is to keep a light control of the uterus between the birth of the child and the afterbirth, and for some time after the delivery of the afterbirth. To do this, sink the ulnar surface of the hand into the abdomen above the fundus of the uterus. Do not massage or rub the uterus at all, but lightly keep contact with the fundus. Normally, the uterus contracts and relaxes, but you can feel it the whole time. Sometimes, however, when the uterus is very flabby and fills with blood, it rises somewhat and its outline becomes indistinct. At the same time the patient's pulse may quicken, or she may get a little pale. It is to detect such an occurrence that we recommend this control of the uterus. This mishap is not common, but when it does occur, it is highly important to be immediately aware of the condition, and this your hand will tell you.

Delivery of the afterbirth. The uterus expresses the afterbirth into the vagina. Owing to the patient lying down, the afterbirth will stay in the vagina a long time. So when the uterus has squeezed the placenta into the vagina, you squeeze it out of the vagina. It is necessary therefore to know how to tell when the placenta has left the uterus and is in the vagina.

How to tell when the placenta is in the vagina.

1. The cord lengthens. A ligature was put on the lightly stretched cord some three inches from the vulva. When the placenta has left the uterus, if you lightly stretch the cord, you will find the part outside the vulva lengthens some inches. This is a most reliable sign. In the event of the placenta being expelled into the vagina before the ligature is tied, this sign of course will not be present.

2. The second sign, however, will be present. Draw the extra-vulval cord out straight. Lay the hands on the abdomen
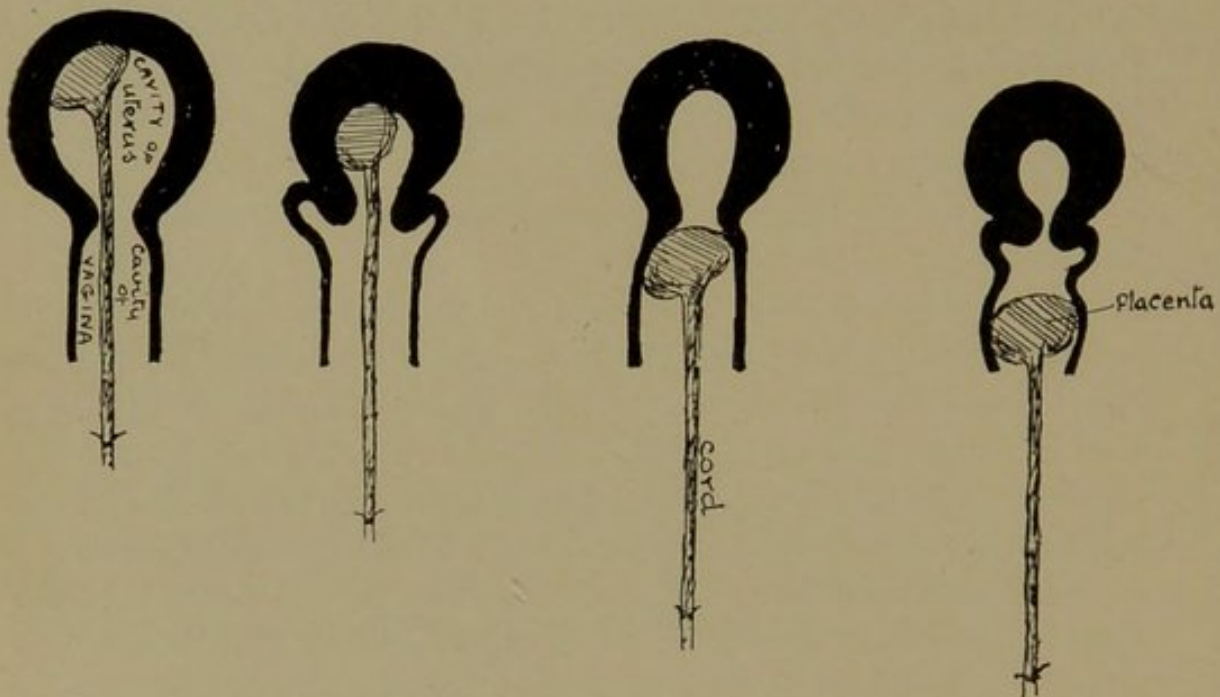
Fig. 41. Diagrams of the expression of the placenta into the vagina and signs resulting therefrom.

and lift the uterus up towards the ensiform cartilage. If the placenta is in the uterus, it too will be lifted up and the extra-vulval cord will be drawn a corresponding amount into the vagina. If the placenta has left the uterus, the cord is not drawn into the vagina. Again, press down the fundus of the uterus gently. The lightly stretched extra-vulval cord advances. Release the uterus, which springs back. If the placenta is in the uterus it springs back too, and the extra-vulval cord is drawn up into the uterus. If the placenta is not in the uterus it does not spring back, and the lengthening of the extra-vulval cord remains. This is the best test.

3. When the placenta lies in the upper part of the vagina, the uterus is perched up on it. The uterus, therefore, rises, and the fundus rises sometimes above the umbilicus. Mark the height of the fundus immediately after the child is born, to detect this sign. It is not always possible to detect this rising of the uterus.

4. For the same reason, the uterus, perched on the placenta in the vagina, can be readily ballotted. This is not a very reliable sign, for sometimes the uterus can be ballotted freely, although it still contains the placenta; possibly when the placenta is in the lower uterine segment.

5. The placenta in the vagina sometimes bulges the hypogastrium like a full bladder, and this bulging can be seen.

Attention to these signs, especially 1 and 2, will enable you to tell when the placenta has left the uterus.

Theories as to the separation of the placenta from its uterine attachment. Commonly three to four pains suffice to separate the placenta from the uterus and expel it into the vagina.

Schultze explains the separation in the following way. Haemorrhage from the uterine sinuses takes place behind the placenta, and a retro-placental haematoma forms and separates the centre of the placenta from the uterus. A contraction occurs and flattens out this haematoma under the placenta, and still further separates the placenta. With the next relaxation more blood is poured out behind the placenta, and so the centre of the placenta gets pushed down towards the cervix. Finally, the centre of the foetal surface of the placenta appears first, and in the hollowed cup of the maternal surface you find the haematoma. We find that in the large majority of cases the centre of the foetal surface of the placenta appears first at the vulva, and in the cup of the maternal surface there is a large haematoma, and we, therefore, think Schultze is right in the majority of cases.

Sometimes, however, the lower edge of the placenta appears first at the vulva, and the placenta folded longitudinally is delivered. The explanation of this delivery is that the placenta separates at the lower uterine segment first, just as it does in placenta praevia, for the lower edge of the placenta

is less supported than the rest of the placenta. We have frequently noticed the placenta coming away in this manner in cases where it has been by force directly expressed from the uterus, and we think it is more likely to be followed by retained membranes.

How long does the uterus take to express the placenta? The uterus may expel the placenta at once after the birth of the child, in five, ten, thirty or more minutes. If it has not done so within an hour, the case is from a practical point of view abnormal.

How to express the afterbirth from the vagina. Ascertain by the signs given that the placenta has left the vagina. It is well to wait for a few minutes after the expression of the placenta from the uterus, for a delay may possibly be advantageous to the separation of the membranes.
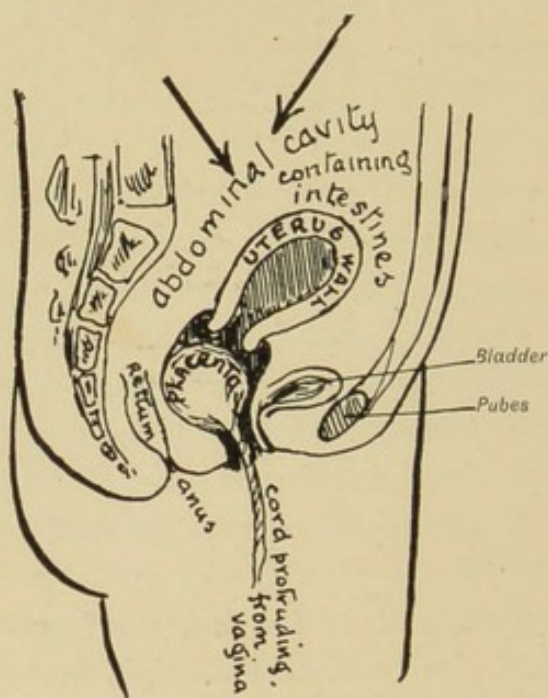
FIG. 42. Diagram to indicate direction of 'push' in expression of the placenta.

Either wait for a contraction or rub the uterus up to a contraction. You use the contracted uterus as a pusher to push the placenta out of the vagina. To do this, grasp the fundus with the hand and press it (1) back towards the spine, and (2) down towards the vulva. Normally the force needed is not great and the gradual rolling of the afterbirth out from the vulva gives the clue to the minimum force that is needed.

Pulling on the cord as well is quite justifiable, if you are sure the afterbirth has left the uterus. If, on the other hand, any bit of the afterbirth is still adherent, it might get broken off and left behind. It is a mistake that might occasionally occur, so it is better to deliver the afterbirth without pulling on the cord. Inversion of the uterus also has resulted from pulling on the cord. A clean small basin pressed up against the buttocks can be used as a receiver for the afterbirth. By using a clean basin or plate in this way, you will save a good deal of mess.

If attempts at expression fail to deliver the afterbirth,

FIG. 43. Expressing the placenta.

either the direction of the force is wrong or the placenta has not left the uterus.

To sum up the delivery of the placenta, watch the uterus with the hand until the placenta has left the uterus, and then express it by pressing the contracted uterus backwards and downwards.

Delivery of the membranes. The method frequently advocated is to twist the placenta round and round until the membranes come away. This is utterly unlike the delivery of the membranes, when left to the uterine and vaginal muscles. Moreover, it can be shown experimentally that a cord, tied to a fixed point and twisted, eventually gives way. It is true the cord gives way near the fixed point, but the fact that it gives way is another reason for not twisting the placenta round and round.

We teach nurses and students to pull the placenta out gently with both hands, so as to put light traction on the membranes. Often this is sufficient to make them slip out of the slippery vagina. If not, take the membranes in their breadth gently with as many fingers as possible, so as to spread the pressure of the fingers evenly. Then pull gently with a slight rocking movement up and down, and from side to side. Gradually they will answer to the traction and come away. Sometimes they tear under the fingers, and the sensation of their giving way is readily recognized. When you feel that they are giving way, take hold of them nearer to the vulva, and again pull gently.

Harm of membranes left in the vagina. The membranes, if left in the vagina, rot quickly in two or three days. A mild sapraemia results. Therefore, if membranes are left in the vagina, it is better to remove them.

How to remove torn membranes from the vagina. With a gloved hand, catch the near end of the membranes with the thumb and middle finger, and twist the index finger round and round them. Pull gently, and they will come away.

What is to be done if membranes are left in the uterus. They may give rise to post-partum haemorrhage, but this is unusual. There is greater risk of sepsis in attempting to remove membranes from the uterus than from the vagina. We, therefore, wait in the house with the patient for two hours. If during that time there has been no disquieting haemorrhage, we give the patient a drachm of Squibb's ergot, and allow the membranes to come away in the lochia, which they usually do without trouble in a few days.

Examination of the afterbirth. In order that you may be quite sure that no piece of placenta or membrane has been left behind, examine the afterbirth carefully. First turn the maternal surface upwards, holding the placenta in the two hands. Normally, the lobes of the placenta, when it is complete, fit accurately together. Should there be a tear, the sides of the tear fit accurately when you bring them gently together by pressing the periphery of the placenta towards the centre. If there is a piece of placenta missing this accurate apposition will not occur. There will be a gap or space not filled by placental tissue. Then examine the edge of the placenta. Occasionally there is a small additional placenta, or more than one, the so-called placenta
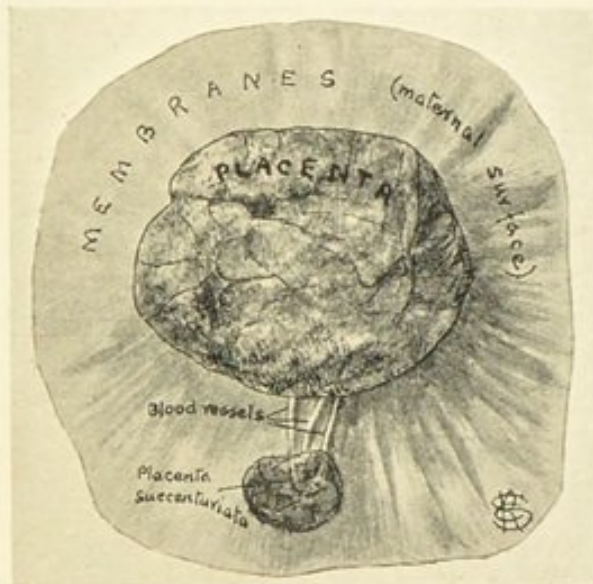
FIG. 44. Afterbirth with placenta succenturiata.

succenturiata. This is fed from the main placenta, either by a thin bridge of placental tissue bearing vessels or by vessels only. If it is left in the uterus the vessels that feed the placenta succenturiata will be found broken off at the edge of the main placenta. It is important to recognize the existence of a placenta succenturiata, for it must not be left in the uterus, but has to be removed like an adherent placenta. We urge care in this respect, for the existence of placentae succenturiatae is often missed, and their presence in the uterus leads to severe haemorrhage or sepsis.

Having examined the maternal surface of the placenta, turn the maternal surface downwards and examine the membranes. If a placenta succenturiata has been left in the uterus, there will be a hole in the amnion and in the chorion corresponding to it. See that the membranes, when spread out, appear to be large enough to enclose the foetus and liquor amnii, and see if any bit is missing.

Sometimes the membranes are so ragged, it is impossible to tell whether any part of them is missing or not.

The perineum. The necessity of carefully inspecting the perineum and the wrong done in leaving a laceration un-stitched have already been urged. There are two conditions you will commonly see. In the one you see a simple central split of the perineum with firm yellow-red tissue on each side of the tear. In the other you see a tongue of vaginal mucous membrane hanging down, as if stripped off the posterior vaginal wall with bruised and ragged blue-red torn tissues. The interpretation of this tongue is as follows. The central raphe of the levator ani is strong. The tearing force takes the line of the least resistance and rips through the bruised and stretched muscular fibres of the levator ani on one or both sides. This lateral tear undermines the mucous membrane of the posterior vaginal wall, which consequently hangs down as a tongue. The tear then starts in the perineum centrally and runs up laterally into the vagina. The support of the pelvic floor to the pelvic organs is impaired much more by this lateral tear of the levator ani than by a simple central tear of the perineum. Prolapse of the bladder, rectum, or uterus follow eventually. More immediately there is some risk of a puerperal ulcer, unless the perineum is united.

How to examine the perineum. The patient lies on her left side, with her buttocks over the edge of the bed. A good light is essential. Having cleansed your hands, pass the left over the patient's right thigh and open the fourchette with the fingers. With the right hand sponge the parts free of blood with wool sponges soaked in biniodide of mercury. By holding the parts well open and sponging them, you will be able to see well. If there is a lateral tear running up into the vagina, pass a gloved finger up along it to discover its

extent and depth. It is a good thing to do this immediately after the child is born, for the parts are least sensitive then, and in addition the patient is only partly conscious if she has had chloroform.

How to sew an ordinary perineal tear. Sewing a perineum is very painful to a woman, and she dreads and is upset by it almost more than by the birth of the baby. Therefore, if you have given your patient chloroform, insert the stitches while she is still semiconscious. You can tie them at the time, or tie them loosely and then tie the second turn of the reef-knot after the placenta has come away. In the case of a primipara, have your sutures, needle-holder and needles ready in the basin before the birth of the child : you are so likely to need them. We use salmon gut and occasionally catgut.
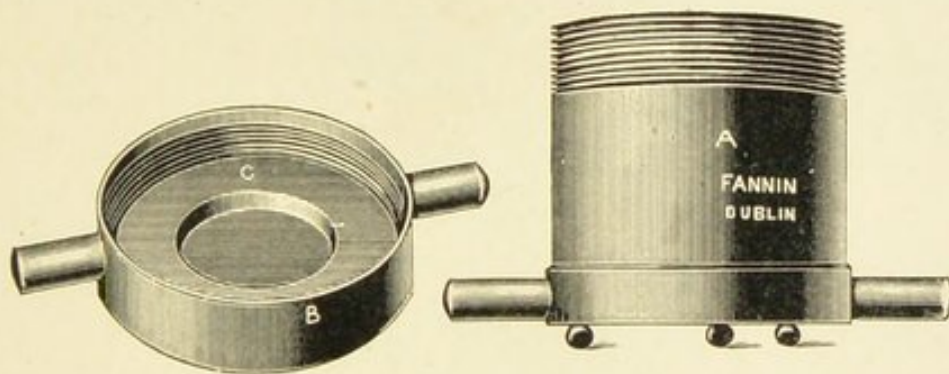
FIG. 45. Jellett's catgut sterilizer. A, strong metal box with screw top, handles, and feet to prevent bumping when boiling ; B, lid with handles ; C, thick rubber washer.

Catgut is best sterilized by boiling for half an hour in alcohol in Jellett's catgut sterilizer. Catgut sutures dissolve away, so you need not take them out, and the patient is unaware that she has been stitched. But salmon gut is more reliable.

The patient is in the same position as for inspection of the perineum. In the same way, too, you use your left hand to open the tear. Take the needle-holder and a big curved needle in your right hand. Starting at the skin edge, plunge the needle down the under side of the tear, then pass it deep to the laceration and bring it along the upper side of the tear out to the skin. *Remember always to keep deep to the deepest part of the wound.* When you lift the inserted needle

all the torn surface is lifted up on it, and so you can tell whether you have included the deepest parts. Do not tie until all the stitches are inserted, and then tie them with reef-knots. If the parts are very ragged and oedematous, do not tie them too tight, for they may cut their way out. Unless the torn tissues are very damaged or have become infected, they unite by first intention. The vulval pad is sufficient dressing.
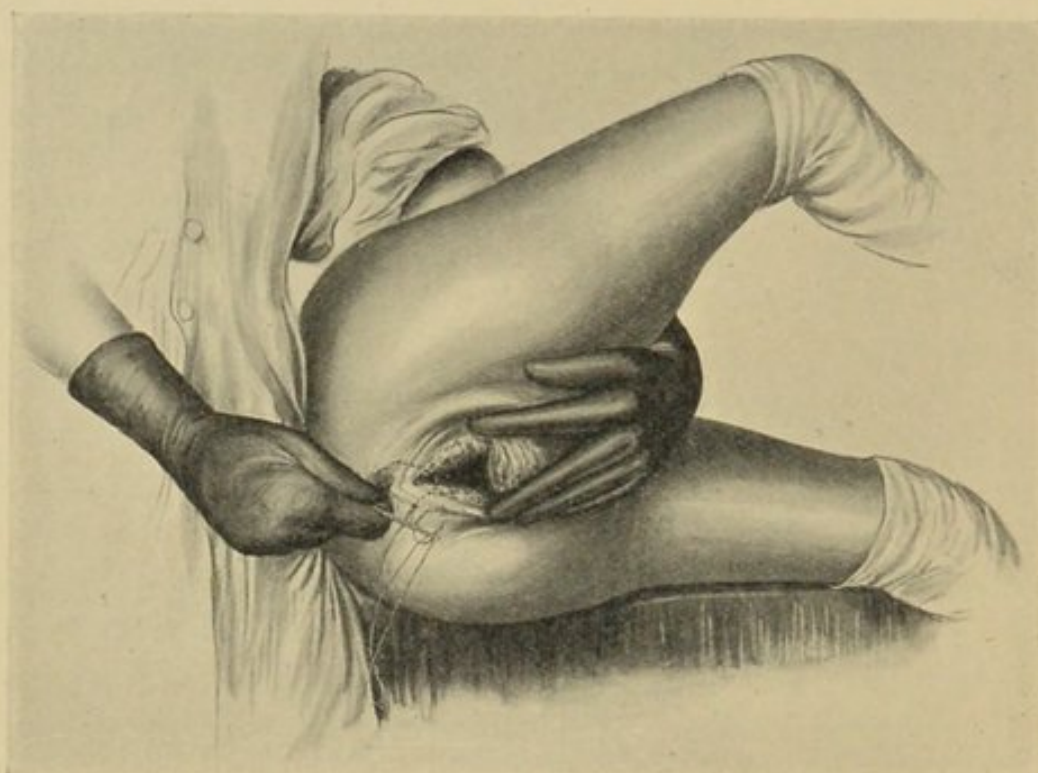
Fig. 46. Sewing a ruptured perineum.

Can a perineum be sewn up later than the day of delivery? Clean granulating surfaces unite readily when brought together by stitches. Therefore, as long as there are raw surfaces, they should be united by sutures.

The pulse of the mother. Count the mother's pulse now and again throughout labour and especially in the third stage and after. The pulse should get slower. If it gets faster, see if the uterus is filling with blood, is big and flabby, or if there is external haemorrhage.

Cleaning the patient. In private practice we always wash the vulva ourselves. Put the patient on her left side, with

the hips over the side of the bed. Separate the thighs a little, enough to enable you to sponge efficiently, but if the perineum is torn, both now and during the puerperium the thighs must not be widely separated. Use lumps of wadding soaked in weak lysol (3j to Oj) and wipe from before backwards, throwing away each lump after one wipe with it. Lysol washes away the clotted blood that clings to the vulval hairs better than any other antiseptics, and obviates the necessity of soap and water. It makes the patient smart if too strong. Do not open the lips of the vulva, but wipe over a closed vulva. It is only necessary to wipe the mucous surfaces of the labia minora before a vaginal examination, and vaginal examinations are not needed after the child is born. Tell the nurse to clean the vulva in a similar manner during the puerperium. It is better than wiping into a bed-pan, which is also used for the evacuation of the bowels. If the nurse asks how often she is to do this, tell her as often as the lochia shows through the aseptic pad, when she also has to put on a fresh pad.

The pad. When the vulva has been wiped, the patient is turned on her back again. She then lifts her back to enable you to wipe her buttocks dry with a towel. At the same time the nurse pulls away the draw-sheet and upper mackintosh into the bath. Put the pad between her legs and she then lies down on the binder. The pads are made of gamgee tissue, and are about ten inches by four inches and two inches thick. They are scorched brown on one side at the fire, and the scorched part when cool is put next to the vulva. Dry pads are better than wet ones. Wet pads are uncomfortable.

Uses of the binder. The binder brings a sense of support to the patient, and as a rule patients like to have a binder for this reason. It also keeps the legs together, if the perineum has been torn. Puerperal women, too, suffer from flatulence, and a binder opposes the distension of the abdomen by wind.

How to fit the binder. The patient is already lying on the binder. The lower border of the binder should be at least two inches below the trochanters. Pin the binder from below upwards. Four stout pins are needed. Make the binder tight by pulling each end with either hand, passing one hand under the other and nipping the binder with thumb and

finger before pinning. We use stout straight pins and pin longitudinally, leaving the point of the pin between the folds of the binder. One pin is fixed near the lower border of the binder, the next over the pubes, the next between the pubes and navel, and the last, which need not hold the binder so tightly, above the navel.

When to put on and take off the binder. It is usual to put on the binder about half an hour after the delivery of the afterbirth, provided there is no post-partum haemorrhage. It is worn until the patient begins to walk about.

The baby. The baby has been wrapped up in a blanket or in flannel and put on the bed or elsewhere, whilst the mother has been made comfortable. Take the baby and examine it for defects, such as cleft palate or imperforate anus. If there is any suspicion that the mother has had a vaginal discharge during pregnancy, drop two drops of 1 per cent. silver nitrate into each eye. This prophylactic of Credé's against ophthalmia neonatorum is of the greatest importance and you should always inquire of the mother as to whether she has noticed any vaginal discharge during pregnancy.

The baby's toilet. The best way to get rid of the vernix caseosa is for the nurse to rub the baby with a little oil before using soap and water. Anyhow it disappears of itself in a few hours. Do not let the nurse put enough water in the bath to totally immerse the baby. The temperature of the bath is to be about 100° F. Dry the cord carefully. We think a small sterile pad scorched at the fire on both sides as good a dressing as any for the cord. Dust the cord with a powder of boracic acid 1 part, zinc oxide 3 parts, and starch 6 parts. Then slit the scorched pad to the centre, slip the cord along this slit and fold the pad over the cord. See that the swather is not too tight to allow the baby the freest respiration. Sewing the clothes on the baby is better than pinning them, for a pin may run into the baby.

Ergot. We do not give ergot in normal cases.

When to leave. In a properly conducted case of midwifery, the attendant should not leave until an hour has elapsed from the delivery of the afterbirth. Little complications may arise. The baby's cord may bleed. The uterus may fill with blood

clots and discharge them, and the nurse be alarmed. True post-partum haemorrhage may occur. Such cases are not rare.

You have been watching the pulse and seen that it has become slower, or at any rate is not faster. You have been occasionally feeling the uterus to see that it keeps well contracted and retracted. Take the temperature of the patient, and make a note of it, the pulse, the nature of labour, &c., in your notebook. Tell the nurse to put the baby to the breast for a few minutes, when she is ready to do so. This trains the baby to the nipple, stimulates the milk flow, and helps the contraction of the uterus. Tell her to let the patient sleep, but we advise her not to draw down the blind, for she cannot watch the patient in the dark and so detect any facial pallor due to loss of blood. The patient may have some toast and tea, if she wishes it. Tell the nurse to see that the patient passes her water within eight hours. The best way the patient can do this is to roll over on her hands and knees. No harm ever results from this. Having giving these instructions, you can now leave.

ROTUNDA LYING-IN HOSPITAL.

Month *June*

BED No. *42*

Name *Ellen Kelly* Age. *33*

Admitted *June 20th* at A.M. *1.30* P.M. No. of Pregnancy *9th* Period of Pregnancy *Term*

PREVIOUS HISTORY.

Previous Labours *Normal* Abortions Premature Full Term *8*

Date of Last Labour *September 26th* ... *1906*

Last Menstruation commenced *September 19th* ... *1906*

State of health during Pregnancy *Good*. On Admission *Good*.

Pelvic Measurements, E.C. *20* In. Crit. *26¼* In. Sp. *25¼* In. Con. Trans. Girth.

DIAGNOSIS.

Abdominal Palpation *1st Vertex*

Vaginal Examination

1. *Os ½ dilated, membranes unruptured, head presenting*
2.
3.
4.

Day	Hours	Hours	Signature
		a.m. p.m.	
20	*VI*	*3*	*Nurse Keegan*
20	*VI*	*5*	*Nurse Fenwick*

LABOUR AND DELIVERY.

Labour commenced *20th* of *June* at *10* a.m. p.m. Membranes ruptured a.m. *5.12* p.m.

Infant Born *20th* of *June* at *6.40* P.M. Placenta delivered *30* minutes.

Presentation *Vertex* Position *1st* Nature of Labour *Normal*.

Membranes *Complete* Placenta *Complete*.

Examined before admission *No*. Perinæum *Intact*.

Student *R. M? Kay* Nurse in charge *Byrne*

PUERPERIUM.

Date of first leaving bed *June 27th 1907*

Date of discharge *June 28th* *1907* Condition when leaving Hospital *Convalescent*.

Day Nurse in charge *Black* Night Nurse in charge *Keogh*

DAY OF MONTH: 20 21 22 23 24 25 26 27 28
DAY OF PUERPERIUM: 1 2 3 4 5 6 7

June 1907

TEMPERATURE

PULSE

| BOWELS | | | | | | | | |
| LOCHIA | | | | | | | | |

INFANT.

Sex *Male* Weight *7½* lbs. ozs. Length *19½* ins. Condition at birth *Alive*

Mode of feeding *Breast*

Condition when leaving Hospital *Healthy*

Bowels *Regular*
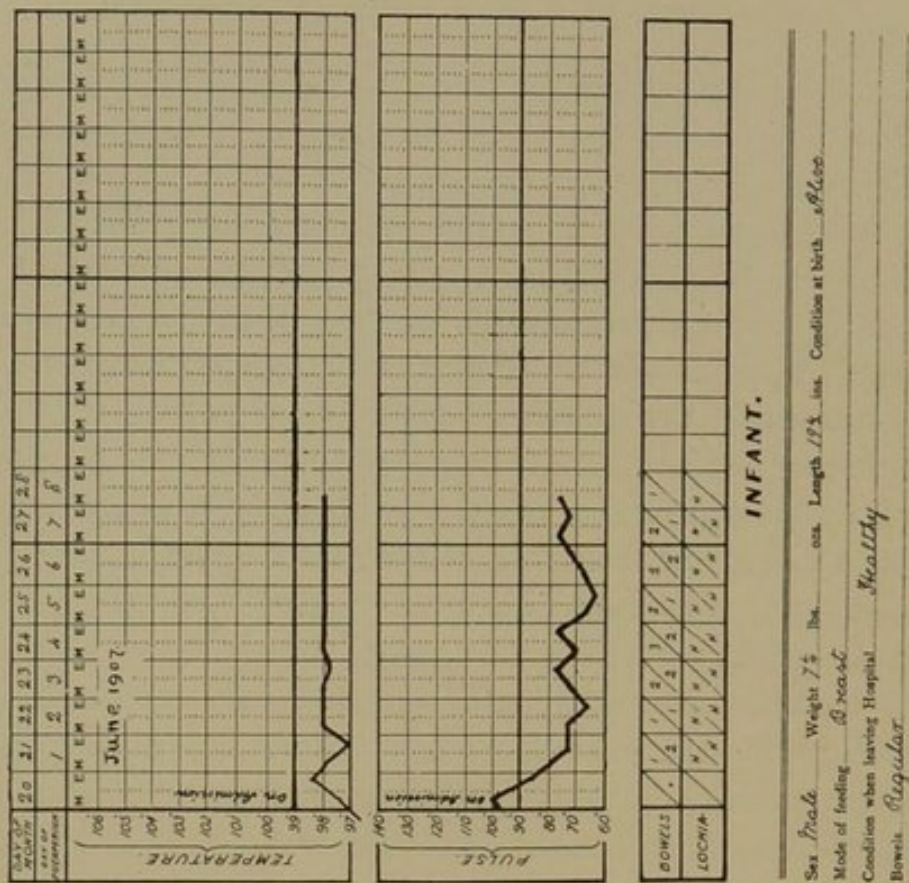
FIG. 47. Chart of normal delivery, as used in the Rotunda.

CHAPTER V

CARE OF THE NORMAL PUERPERAL WOMAN

The first visit is made within fourteen hours of the birth of the child. We make daily visits for the next six days, and then a visit every other day for fourteen days.

The things to pay note to at a visit are, the temperature and pulse of the patient, the height of the uterus, the lochia, the condition of the breasts, the state of the bowels, the passing of urine, the diet and amount of sleep, and the ventilation of the room. Attention to the baby will be described in the chapter on the infant.

The temperature. In the first twenty-four hours the patient's temperature is very likely to rise. The first twenty-four hours constitute the unstable period. But if the temperature is raised above 99° F. after the first twenty-four hours, a cause must be sought.

The pulse. Similarly, if the pulse after the first twenty-four hours rises above 90, a cause must be sought. The temperature then should remain at or below 99°, and the pulse at or below 90 in a normal puerperium. In a nervous patient the pulse rate rises when you go into the room, but falls as the patient gets accustomed to your presence.

The height of the uterus. The big pregnant uterus, owing to contraction and retraction, instead of being red with blood, becomes pale and anaemic. The starved hypertrophied muscle fibres shrivel up to the size of ordinary muscle fibres, and at the end of six weeks the uterus is but little larger than the original virgin uterus. At the end of about fourteen days you may expect to find the uterus once more a pelvic organ. Its rate of 'involution', as this shrivelling process is called, varies greatly in women, and you do not gain

much by learning how high the uterus should be on a particular day. What you should note is the gradual nature of the process. If a sudden dropping of the uterus occurs, it leads you to suspect the sudden bending forwards or backwards of the body of the uterus, namely acute anteflexion or retroflexion.

The lochia. The lochia is the fluid that oozes principally from the placental site, but also from the walls of the uterus, and from lacerations of the cervix, vagina, or perineum. This oozing is pure blood for a day or two, then blood mixed with watery serum, then the blood gives a brownish rather than red colour to the serum, and finally, about the fourteenth day, the lochia ceases. As in the case of involution of the uterus, the important thing to notice is the gradual change in the nature and amount of lochia from day to day, rather than its exact nature on a particular day. Normally, the lochia is free from pathogenic germs, and has a peculiar, but not foetid, smell. Tell the nurse to look for blood clots or pieces of membrane in the lochia.

The breasts. If the breasts are squeezed on the day of delivery, you find a yellow fluid exudes from the nipple. This is called colostrum. The colostrum is replaced by the milk on the third or fourth day. Before each feed to the baby, cleanse the nipples with clean cotton-wool and clean water. After each feed wipe away any remnant of milk with damp cotton-wool, and then wash them with boric acid lotion.

The bowels. A woman's bowels are apt to get confined whilst she is lying in bed. Give her a purge, such as a blue pill (with Apenta water in the morning), on the evening of the second day. An enema may be necessary. We let her sit up on the bed-chamber when the bowels are opened. Give her medicine after this to keep her bowels opened once a day. We do not find that a purge to the mother often affects the child.

The urine. From the first, the patient can roll over on her hands and knees to pass her water, keeping her thighs pressed together, if she has had a torn perineum. If she cannot pass her water in this way, tell the nurse to put

flannels wrung out in hot water over the pubes, and let the patient try again. If this fails, and she has not passed her water for twelve hours, pass a catheter by sight, first sponging the mouth of the urethra with biniodide of mercury (1–2000). There will be no need to pass a catheter again in a normal case. At any rate, avoid doing so, if possible, for a woman is liable to get a catheter habit.

Diet. For the first two days the diet should be light. Our patients in hospital have soup, milk, bread, and arrowroot. After the bowels have acted she may have fish, and after that anything she can digest. She should not eat so much that she gets dyspepsia. Let her have plenty of fluid and milk, but only at her meals. She may have stout, if she likes, but there is no exceptional merit in stout. The diet of the nursing mother is also described in the section on the infant.

Sleep. On the night after her baby is born, a woman usually sleeps very well. But if she does not sleep during the puerperium, you must make her sleep with hypnotics, such as veronal gr. vii to x, followed by a hot drink. Absence of sleep often is the forerunner of puerperal insanity, or is a symptom of sepsis.

The room. See that the windows are kept open, and the room is not stuffy. An open window day and night is good for the baby, and will not give it cold. The mother can have the blinds down if she likes, but there is no need for them to be down. It is not well to treat her too much as an invalid, for women are very open to suggestion, and are very ready to fancy themselves delicate, if others suggest that they are.

Visitors. She may see her husband, but if she is an excitable woman, keep other people from her for the first three days.

Afterpains. Afterpains are usually due to clots in the uterus. Massage the uterus, and squeeze out the clots, and give Squibb's ergot ʒj three times a day either alone or with liquor morphinae (ɱ) x to xx).

When can she get up? We keep our patients in bed until the uterus has become a pelvic organ, and the lochia has

ceased or is very slight, that is, between the tenth and four-teenth days. If the lochia becomes red, as the result of getting up, the patient had better have another day or two in bed. A woman should not stay in bed longer than a fortnight, unless there are good reasons for her doing so. Our hospital patients get up on the seventh day, and go out on the eighth.

A woman may sit up in bed on the fifth day, and before that on the bed-chamber whenever the bowels are opened. She may go out after she has been up for five or six days.

Douching. Normal cases need no douching either before or after labour.

PART II

ABNORMALITIES OF PREGNANCY

CHAPTER VI

ABNORMALITIES DUE TO SOME SEPARATION OF THE OVUM FROM ITS IMPLANTATION SITE — CONDITIONS RESEMBLING THESE CLINICALLY

Abortion—Miscarriage and Premature Labour—Vesicular Mole—Extra-Uterine Pregnancy—Hydrorrhoea Gravidarum—Polypus—Cancer.

WHENEVER there is separation of the ovum from its implantation site, whether partial or complete, bleeding takes place. As a rule the blood appears at the vulva.

The abnormalities that are included under the above heading are (1) abortion, (2) miscarriage, (3) premature labour — different names for the same thing occurring at different periods of pregnancy; (4) extra-uterine pregnancy, (5) vesicular mole—both allied in nature to abortion, but modified, the first by position, the second by the degeneration of the ovum; (6) accidental haemorrhage, (7) placenta praevia—both allied in nature to a threatened abortion; and lastly, (8) hydrorrhoea gravidarum, (9) polypus, (10) cancer—included here, because the signs to which they give rise may be mistaken for abortion.

The practical value of grouping these together in this way will be seen by their resemblances and differences as well as by the similarity of the principles of treatment applied to them. For example, when bleeding is severe, whether due to abortion, vesicular mole, accidental haemorrhage, or extra-uterine preg-

nancy, the safety of the patient depends on the speed of the complete separation of the ovum, and treatment is devoted to bringing about this separation as rapidly as possible.

ABORTION

By *abortion* is meant the death and expulsion of the ovum from the body of the uterus. When the dead ovum is expelled into the cervical canal and retained there by the closed external os, the condition is called *a cervical abortion*. When part of the ovum is expelled from and part retained in the uterus, it is called *an incomplete abortion*. When the ovum dies, but is not expelled from the uterus, it is a *missed abortion*. When the ovum dies and is expelled in its entirety through the external os, it is a *complete abortion*. When some of the ovum is detached, but the ovum continues to live, the condition is known as a *threatened abortion*.

Causes of abortion. Abortion is a very common occurrence. About fifty per cent. of married women have either one or more abortions. Yet it is by no means possible to assign a cause to every case.

Causes which have a practical bearing in the prevention of abortions are poisons, syphilis or diseases that lead to an unhealthy endometrium. Diseases of the foetal membranes themselves, which may lead to abortion, are little understood and cannot be prevented.

1. The diseases which lead to an unhealthy endometrium are (1) heart disease, (2) kidney disease, (3) liver disease, (4) septic endometritis, (5) misplacements of the uterus, (6) myomata in the uterine walls, (7) pelvic disease which leads to pelvic congestion, (8) arterio-sclerosis, and (9) gout. To what degree these different diseases tend to cause abortion we cannot say. But if a woman has had an abortion, examine her six weeks afterwards, both gynaecologically and medically, to find out if any of these conditions are present.

2. *Poisons.* Lead poisoning and gas poisoning occasionally cause abortion. So too oxytocic drugs, if given in poisonous doses.

3. *Syphilis.* Syphilis may lead to an unhealthy endome-

trium or disease of the foetus. If there is any suspicion of parental syphilis, put both parents through a course of treatment.

4. A fall or injury sometimes determines abortion, but will not do so in a healthy woman, unless both direct and violent.

5. Lastly, remember criminal abortion.

Symptoms and signs. Separation of the ovum leads to bleeding, so the first sign a woman has that she may abort is blood on her clothes. Contractions of the uterus are set up and so the patient has pain of an irregularly intermittent nature.

When the pain is regular and intermittent, the expulsion of the ovum is to be expected, for these contractions are of a similar nature to labour pains, the pain being due to the opening of the internal os.

Send your patient to bed if she is not already in bed, and make a vaginal examination, with exactly the same careful attention to cleanliness as if full term labour was commencing. You will note the signs of pregnancy, such a blueing of the vulva and vagina, softness of the cervix, and corresponding size of the uterus to the patient's history of amenorrhoea. You will very likely find clots of blood in the vagina if the patient has been in bed. Keep them for examination. Then feel the os and cervix. If the abortion is complete, the cervix feels pear-shaped with the apex up, if incomplete pear-shaped with the apex down. A little experience makes this a useful distinction. If the internal os is open, abortion is very likely but not certain to follow. You may feel the ovum protruded into the cervical canal in some few cases. This, the partial expulsion of the ovum from the body of the uterus, is a stage of abortion and it has now passed beyond that of threatened abortion. You may mistake blood clot in the canal for the ovum, but you can break blood clot up with your finger tip.

You must then examine from a diagnostic point of view to exclude extra-uterine pregnancy and vesicular mole. In extra-uterine pregnancy you find a tender mass either behind or to the side of the uterus displacing the uterus and separated from it by a groove. Suspect vesicular mole, when the uterus is larger than the period of amenorrhoea indicates, and feels

doughy, or when you find the characteristic white currant cysts embedded in red jelly clot. Finally, feel for the rectum, which is often full of scybala.

Examination of clots, &c. The nurse will always keep

FIG. 48. Ovum from twelve to fourteen days old. Natural size, showing chorionic villi.

anything that comes away, for the doctor to see. Sometimes the patient does so too. Examine blood clots and 'lumps of

FIG. 49. The same laid open and showing the embryo. Magnified four times.

flesh' carefully for bits of ovum, or for 'white currants embedded in red jelly', which are the certain sign of vesicular mole, or for a decidual membrane which forms a complete cast of the interior of the uterus, and is expelled in some cases of extra-uterine pregnancy (q. v.).

The figures show you the different appearances of abortions. Sometimes the blood, instead of escaping through the os, is extravasated into the decidua outside the membranes, and the ovum becomes a mass of blood clot with withering or absorption of the foetus. This is known as a carneous mole.

In other cases you have to guess that a complete abortion has occurred from the patient's account of the 'lump of flesh' that she passed and its size.

Fig. 50. The embryo magnified, showing large yolk-sac and small amnial cavity. (By permission of Mr. J. Keogh Murphy and Professor A. F. Dixon. Specimen from the Rotunda.)

Treatment. You have excluded extra-uterine pregnancy by vaginal examination, and you have no reason to suppose
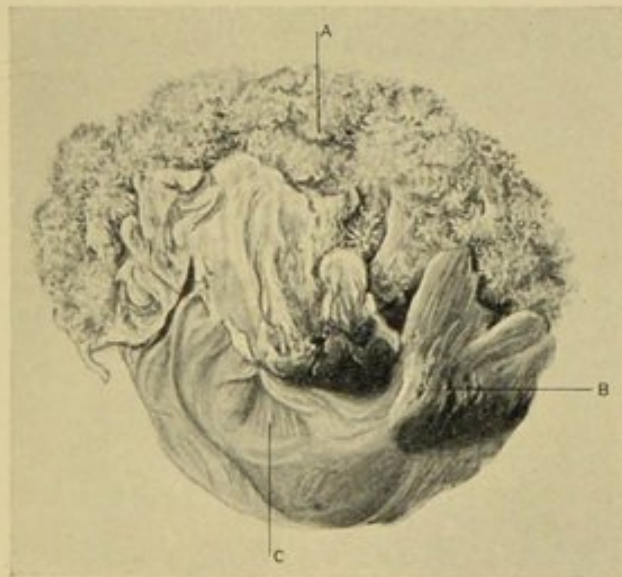
Fig. 51. Complete abortion, of about three months. The decidua has remained in the uterus. A, chorionic villi; B, blood clot; C, embryo. (Rotunda specimen.)

the case to be one of vesicular mole. You have to deal with far the commonest cause of bleeding in the early months of preg-

nancy, namely, abortion.   But unless the whole ovum has
been expelled and kept for you to see, you will find it imposs-
ible as a rule to decide whether the ovum is alive or dead.
If you feel part of the ovum in the cervical canal you may
be sure the ovum is dead, but such cases are rare.   The rule
for treatment is that you should remove a dead ovum from
the uterus or the remnants of a dead ovum, but not a living
ovum.   But you will find it impossible in most cases to
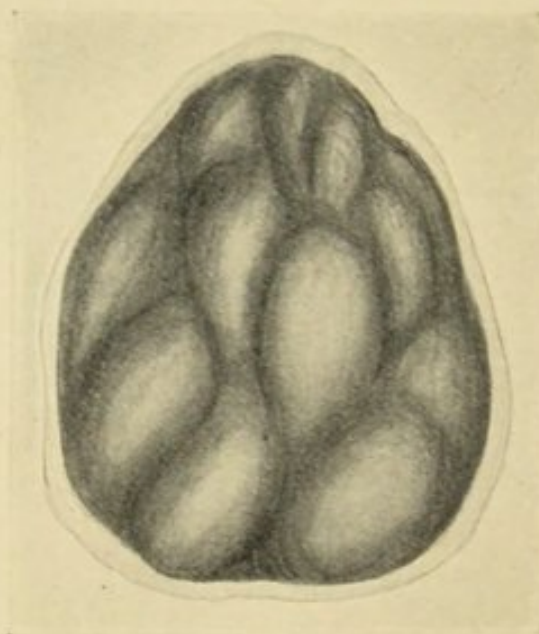
Fig. 52. Carneous mole.

be sure whether the ovum is alive or dead, and it is unsafe
to rely on a patient's account.

If the entire ovum has been expelled and you see it,
treat your patient much as you would treat her if she had
had a full-time child.   Keep her in bed until red lochia
has ceased, keep the vulva scrupulously clean, let her wear
scorched pads, keep her bowels opened, attend to her diet,
sleep, the ventilation of her room, and give her ergot if she
has afterpains.   Do not douche her or make unnecessary
vaginal examinations.

**If you feel part of the ovum in the cervical canal, or
see it when it has been discharged,** your treatment is to
empty the uterus.

All other cases we advise you to treat as threatened abor-

tion, unless constitutional symptoms arise. Some fifty per cent. of threatened abortions when treated go to full term, so your treatment is well worth while. ·

To treat a threatened abortion. Put your patient to bed and keep her in bed until all pain and bleeding have ceased for five days. Constipation is practically sure to be present, therefore give the patient some salts or any laxative she is accustomed to take, and a small enema, but not a violent purge. One drachm of castor oil in coffee every four hours as a rule acts well, or an enema of ten ounces of olive oil. If you find the uterus retroverted, anteflex it, using bullet forceps if necessary, and put in a pessary (*see* under Retroverted gravid uterus, pp. 163–164). As regards drugs, if there is much pain and restlessness, we give opium. Calcium lactate (z ss. to z j, as a powder) tends to increase the coagulability of the blood and therefore to stop bleeding, and we therefore give it.

The cessation of bleeding can sometimes be told by the colour of the blood and clots. Recent blood is red. Old blood is darker.

When all symptoms have ceased for five days, allow your patient to get up, but keep her very quiet. She must avoid much exercise. She must avoid coitus. Bleeding is apt to recur. If it does so, tell her to go to bed and send for you.

We insist once more on this treatment of cases in which you are in doubt as to whether the ovum is dead or alive. Treat them as threatened abortions, that is, treat them as if the ovum is still living and there is hope that by care it may be brought to full term. As this favourable result is frequently attained, every care and attention is fully repaid. Unless this maxim is adopted, there may be needless sacrifice of foetal life. If you judge that an abortion is 'inevitable' by the size of the os, the amount of blood lost, and the character of the pains, you will sometimes destroy an ovum that would otherwise continue to live. Therefore we should be glad to see the word 'inevitable' in relation to abortion expunged. Even when inevitable, the natural efforts of the uterus succeed in the great majority of cases in expelling the ovum, and it is not necessary to interfere.

When to empty the uterus.

1. If, in spite of keeping the patient in bed, dribbling of blood continues for six weeks. We then feel justified in treating the case as one of dead ovum.

2. In those cases where part of the ovum can be felt protruding into the cervical canal.

3. When the diagnosis of cervical abortion has been made. The dead ovum is lodged in the cervical canal, but the external os is tightly closed. The cervical canal is bulged and the cervix, instead of feeling conical, feels as wide as it is long.

4. When you have diagnosed incomplete abortion, either by a clear and concise history of the foetus being seen or by finding a portion of the ovum in the blood clot. (Incomplete abortion is more common after the formation of the placenta at the end of the third month.) In these cases one of two things happens. The uterus will eventually expel the rest of the ovum. But as each piece separates a fresh haemorrhage takes place, to be followed by a brown discharge, and later another haemorrhage. There is therefore a series of recurrent haemorrhages. Secondly, the remnants putrefy and give rise to foul lochia and sapraemia. The signs of a living ovum and advancing pregnancy cease.

5. When you have diagnosed missed abortion. You diagnose this by finding that the signs of pregnancy cease to advance in a case where you have been able to bimanually palpate the uterus and watch the signs of pregnancy; or in some cases you find the same signs as in incomplete abortion, namely, repeated haemorrhages and brown discharge, or brown discharge and sapraemia. The diagnosis is made by your patient telling you that she has had amenorrhoea several months, and yet bimanually you find the size of the uterus does not correspond to her history. This with the brown discharge or haemorrhage suffices to establish the diagnosis.

6. When constitutional symptoms arise in the mother, such as pallor from the amount of blood she has lost; or if she has a shivering fit, or the pulse and temperature rise without other reason.

How to empty the uterus. We will first describe the

technique that applies to a case when the internal os will admit one and probably two fingers into the uterine cavity. If you are compelled to empty the uterus owing to the large loss of blood in a threatened abortion, you will almost always find the os as dilated as this. If it is not, it is more likely that you have been unduly alarmed, than that there is need to empty the uterus.

Enema. If the rectum is full, first get the nurse to give the patient an enema.

Position of patient. The patient lies in the cross-bed position. She lies on her back with her hips over the edge of the bed, so that the vulva just projects over the edge of the bed. A mackintosh passes from beneath her and hangs like a valance over the edge of the bed, with its lower edge dipping into the bath. At first, until you are ready, rest her legs on a chair.

Anaesthesia. If she is nervous and resists, it is better to get some one to give her an anaesthetic. If she keeps her abdominal muscles tense, she must be anaesthetized. If she has not had a full-term child she must be anaesthetized, for you have to pass at least your half hand, that is, the hand without the thumb, into the vagina. In other cases an anaesthetic is not needed.
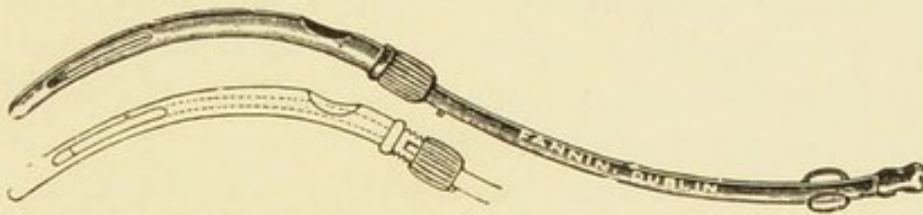
Fig. 53. Bozemann's uterine catheter.

Instruments, &c. The instruments you need will be a douche can or Rotunda douche, a catheter, a vaginal nozzle, and a large and a small Bozemann's catheter. We wear rubber gloves, but take them off if we find difficulty in completely freeing the ovum from the uterus. You should also have a Rheinstadter's flushing spoon curette; some iodoform gauze; plugs of wool in a small basin with boiling water, a little lysol, and a piece of soap in it; a pair of tongue or other forceps; plugging forceps; and, lastly, a clean jug or douche can, filled

with douching solution.   We either use plain salt solution at a temperature of about 90° F., or creolin (℥ ss. to the pint). The creolin solution is made up first with cold water from the tap.   Tap water very rarely contains pathogenic germs, and if it did, we hope the creolin would kill them.   Boiling water from a kettle is added by the nurse, when you are ready to begin douching.

The necessity for antiseptics.   We have said we sometimes use creolin.   We do not use it in strong solution, nor do we rely on it, but use it chiefly on the grounds that it is non-poisonous, does not seem to do harm, and may do good.   The modern tendency is not to rely on antiseptics, but to place trust in plenty of soap and water.   Antiseptics are a real danger if, relying on their power, nurses or doctors slacken the care with which they clean—their hands, by vigorous scrubbing, the external genitals, by washing with soap and water, and any instruments that are likely to be used, by boiling.

Cleansing the hands.   The hands are cleansed by scrubbing them with a boiled scrubbing-brush with soap and water for four minutes, rinsing the soap thoroughly from the hands with plain water, soaking the hands for one minute in biniodide of mercury (1–1000), and wearing boiled rubber gloves.

Doctor's position.   You sit on a chair between the patient's legs.   Her legs are held up by the nurse or assistant, or if she is not anaesthetized, she puts her right foot on your left knee and left foot on your right knee and separates her own knees. You wear a long mackintosh, which covers your knees, and the lower edge of which dips into the bath.

Cleansing the external genitals.   The nurse has already given them a preliminary wash with soap and water.   You now take the tongue forceps and pick up one of the pieces of wool from the little basin with hot weak lysol and soap.   You can get a free lather this way, and lather the pubic hair and folds of the groin freely with soap and water.   Throw the used wool into the bath, and pick up a fresh bit and again lather, and so on.   Cleanse the neighbourhood of the anus in this way, but do not rub from the anus towards the vulva, but use your lumps of wool for the anal region and anal

region only. With fresh soapy wool wash thoroughly the muco-cutaneous surfaces of the labia minora. Then take the end of the douche tube without any nozzle, and, after testing the heat of the douche by pressing the can or jug with your bare elbow, pinch half the exit of the douche tubing. You thus make a fine jet of douche fluid. Again lather the whole surface with different bits of soapy wool, playing a fine jet of douche fluid over the parts at the same time. Rub hard with the wool. Again cleanse the muco-cutaneous surfaces of the labia minora with soapy wool and douche jet. Finally, hold the labia open with the opened tongue forceps and play the jet over their surfaces, over the vestibule and urethral area. You are thus able to cleanse the external genitals without touching them with your gloved hands.

Passing a catheter. It is a rule always to pass a catheter before any obstetrical operation. Take your sterile catheter from the basin or dish, and, separating the cleansed labia with your fingers, pass the catheter by sight.

Rationale of vaginal douching. Menge, Kroenig, and Whitridge Williams have made bacteriological examinations of over three hundred pregnant women. They found that, normally, not only are there no pathogenic organisms in the vagina, but the vaginal secretion is rendered acid by some non-pathogenic bacilli that normally live in it, and that this acid actually kills pathogenic germs. It acts, in short, like the acid of the gastric juice, as a protective barrier against pathogenic germs. It is owing to this discovery that routine douching before labour has been generally abandoned. But in the case of abortion, the vagina usually contains blood, blood clots, or brown uterine discharge, in all of which saprophytes can readily live and defy their enemies, the acid secreting microbes. Hence the necessity of thoroughly cleansing the vagina before emptying the uterus.

Douching the vagina. The can or jug is placed some three feet above patient's bed. Put two fingers into the vagina and insert the vaginal nozzle, whilst douche fluid is flowing from it. The advantage of having two fingers in the vagina is threefold. Firstly, there is no fear of fluid being forced into the vagina under pressure and then escaping with foul vaginal

contents into the uterus; secondly, the vaginal rugae are smoothed out and every part of the smooth wall is well irrigated (the great importance of this in ridding the vagina of germs was long ago pointed out by Pozzi); thirdly, a free back flow of fluid out of the vagina is permitted, which by its mechanical impetus thoroughly flushes out the vagina.

Rub the fingers round the vaginal walls and see that the nozzle reaches up to the vault of the vagina, first in one fornix and then in the other. About half to one gallon of fluid will be required.

The internal os is open sufficiently to permit the entrance of one or two fingers into the uterus. You have now to free the ovum completely from its attachment to the uterine wall. The area around the vulva is clean and the vagina is clean. Soap your gloved hand, so that it will slip easily into the vagina. Put the finger tips together, making the hand cone-shaped, and pass the whole hand into the vagina. If you cannot do this, pass the half hand, that is, the hand without the thumb. Lay the other hand on the abdomen, interposing a sterile towel or piece of boiled batist, if you have either, and so keep your hand clean for the uterine douche. Steady the uterus with the abdominal hand and push it towards the vaginal hand. Pass the index and middle finger of the vaginal hand into the uterus. If only one finger will pass, let it be the longer middle finger. Explore the interior surface of the uterus and separate the ovum completely. Completeness is essential, and hence it is better to use no glove than to be uncertain with a gloved finger.

It is not possible to pull the separated ovum out through the cervix with the fingers. Therefore withdraw the two

Forming hand into cone.

Fig. 51.

fingers from the uterine cavity and place them in the anterior fornix. Anteflex the uterus with the abdominal hand and squeeze it between the abdominal and vaginal hands. This squeezes its contents into the vagina. Remove them from the vagina and examine them in a basin of cold water. If you think they are not complete, again explore the uterus with the fingers and squeeze the uterus. Repeat these manœuvres again and again sooner than have remnants in the uterus. If the vulva and vagina are clean you do no additional harm by repeated exploration.

If the uterus is retroflexed and you cannot anteflex it (the method will be found on pp. 163–164), you must put your vaginal fingers in the posterior fornix and so squeeze it bimanually. The ovum being completely freed and squeezed out of the uterus, you now douche out the uterus with a Bozemann's catheter.

Dangers of douching the uterus and how to avoid them.

1. Rupture of the uterus by the nozzle. Use a large round-ended nozzle, never push hard, and you will avoid this risk.

2. Distension of the uterus with fluid has led to death. Fluid has even been forced through the Fallopian tubes into the peritoneal cavity. Distension is avoided by using a Bozemann's catheter with its large reflow tube. Sometimes the reflow tube gets blocked by a blood clot. To avoid this move the catheter gently to and fro in the uterus and watch for the free reflow of the fluid out of the vagina.

3. The patient has died from antiseptic poisoning. Creolin is non-poisonous.

4. Air has been forced into the uterus and fatal air embolism is said to have resulted. If you hold the catheter before insertion with its point upwards until fluid flows out as it does from a fountain, and then insert the catheter, there will be no air in the catheter.

5. A clot of blood is said to have been forced into a vein and fatal pulmonary embolus result. To avoid this, never have the douche can more than three feet above the bed. A great rush of fluid is thus prevented.

How to douche the uterus. Pass two fingers into the vagina and feel for the os. With them guide the Bozemann's

catheter, through which fluid is flowing, into the uterus. If there is much haemorrhage, the fluid should be as hot as the patient can bear and you can bear flowing over your arm, for the hot fluid stops the bleeding. Little shreds of decidua come away with the back flow and sometimes block the catheter. If so withdraw the catheter, free its passage and reinsert it. Douche until the return is clear or only tinged with red.

Necessity of drainage. There is no necessity to drain the uterus after the removal of an abortion, unless the uterus is retroflexed, or the case septic before removal. Then you should pass a wick of gauze into the body of the uterus with plugging forceps, guiding the forceps into the uterus with fingers in the vagina. Leave it in for twenty-four hours. Afterpains will be thus avoided and the lochia escape more freely. Give ergot, too, in these cases.

After-treatment. If you have observed strict cleanliness and have completely emptied the uterus, and if the case was not already septic, you can both be assured and can assure your patient that all trouble is now over. Keep her in bed until red lochia has ceased for two days, and follow out the same treatment as you adopt after the birth of a full-time child.

What to do if the internal os will not admit one finger. No method of separating the ovum from the uterus is nearly as satisfactory as separation by the fingers. If, however, the internal os will not admit one finger it may admit a curette; you can then use Rheinstadter's flushing curette. If you cannot get in a curette, you can either plug the vagina and cervix or dilate the os with Hegar's dilators until you can get one finger or the curette into the uterus.

Choice of these methods depends on the urgency of the case and the instruments you have at hand. We advise you to use a curette if you can, and if you cannot to dilate the cervix.

How to curette with Rheinstadter's curette. The position of the patient and yourself is the same as already described. The vagina has been douched. Take the largest Rheinstadter you have. A flexible stem enables you to bend it, so as to adapt it to the position of the uterus. Fit the curette to the tube of the douche and guide it into the uterus by the two

fingers in the vagina, whilst the stream is running. A posterior speculum with a bullet forceps on the anterior lip to pull down the cervix will enable you to see the cervix, if you have difficulty in passing the curette. If the Rheinstadter will not pass the internal os, pass in plugging forceps into the uterus and open them to stretch the os. Then pass in a small Bozemann's catheter and leave it in a minute or two. You will often be able to get in the curette after doing this. In using the curette steady the fundus with one hand laid on the patient's abdomen. There is no necessity to thoroughly scrape the whole uterine wall. You rather entangle the ovum and rupture its attachments to the uterine wall with the curette. If you use force you run a distinct danger of rupturing the soft pregnant uterus. Therefore curette as gently as possible, turning the handle of the curette systema-tically so that the scraper misses no part of the uterine wall. The uterine contents may be pulled out with the curette or expressed bimanually. Examine them to see if all have probably been removed. If not, curette again gently. Finally douche out the uterus, using a Bozemann's catheter, and insert a wick of iodoform gauze. Give ʒj ergot twice in the day. Pull out the gauze at the end of twenty-four hours. An anaesthetic is not needed. You will sometimes find that in spite of breaking up the ovum, you fail to squeeze it out; but by putting a light plug of gauze into the uterus and giving ergot, the fragments will come away within twenty-four hours. Should they still fail to do so and blood come with the lochia for two weeks after your curettage, you will have to dilate the cervix with Hegar's dilators and curette the uterus gently with a sharp curette.

Dilating with Hegar's dilators or metal dilators. Being forewarned, you may wisely have taken dilators with you. After douching the vagina, catch the anterior lip with bullet forceps, guiding the forceps to the cervix by two fingers in the vagina. Then pull the cervix down to the orifice of the vagina. Insert a posterior speculum, and get some one to hold it in its place, for you can then see better and you keep the dilators from touching the perineum. Swab the lips of the external os with a pledget of wool soaked in biniodide

of mercury (1–1000), start with the largest dilator that passes easily. Pass it through the internal os. Then pass the next size, and so on. When the internal os does not readily yield, leave the dilator that fits in for a minute or two and it will yield. Do not use force, because a tear of the cervix running up into the fundus has followed force. By taking plenty of time you will be able eventually to pass No. 18 and then you can get in one finger. The advantage of Hegar's dilators is that you can do the whole thing at a sitting. Your patient must be anaesthetized, as dilatation is painful.

Plugging the cervix and vagina. This is a very good way of dilating the cervical canal, and the one nearly always adopted in the Rotunda Hospital, if the os internum is not sufficiently open to allow the passage of the finger or Rheinstadter's curette. The preparations are the same as for the use of Hegar's dilators, the os externum being drawn down by bullet forceps. Pass a strip of iodoform gauze up to the fundus of the uterus with plugging forceps. If you cannot do this owing to the tight internal os, pass it into the cervical canal and stuff that as tight as you can with gauze. If you have boiled glycerine with you, you can soak the gauze in it first, for the glycerine makes the cervix soft, but we do not often use it. You can boil glycerine in an iron spoon over a spirit lamp. Next you have to plug the vagina, and you do this with pledgets of sterile wool about the size of the top of the thumb. You can sterilize them by boiling in a saucepan. Then pour the water out of the saucepan and fill it up with 0·5 per cent. lysol and let the plugs soak in them. If you have no wool and the case is bleeding, you can use torn handkerchiefs washed and boiled for fifteen minutes. The patient is either on her back with the perineum projecting over the edge of the bed, or you can turn her in the left lateral position. The vagina has been douched. Pass the half or three fingers of your left hand into the vagina and pull back the perineum. Your fingers act as a posterior speculum, and when you do this you will find you open the vagina widely and you can push your plugs of wool in easily. Squeeze a plug as dry as possible and push it into the vault of the vagina. Then take another plug and do

similarly. So pack the vagina tight with these plugs. You will want plenty of them, and it is well to have a pudding basin full of them. Hold them in with a T bandage. Give ℥j of Squibb's ergot, and repeat the dose in six hours. Remove the plugs in ten hours. You will have no difficulty in finding and removing them, and you will frequently find the complete ovum lying on the top of the plug or it will come out with the iodoform gauze or you can squeeze it out of the uterus by bimanual compression.

A great advantage of the plug is that it stops bleeding. You can leave your patient safely, if you have tightly plugged her vagina, though it is well to ask the nurse to occasionally look at the vulva and to let you know if any blood appears. The disadvantages of the plug are that both plugging and withdrawing the plug are painful, and the presence of the plug makes the patient restless and uncomfortable. Although an anaesthetic is not necessary, it may be wise to give some tincture of opium after plugging, to keep your patient quiet. Again, maceration of the vagina results from the pressure of the plug and is occasionally followed by vaginitis, which itself may lead to infection of the uterus. This is not a result that you need fear in the great majority of cases, but it does on rare occasions happen. If the uterus is septic, plugging must not be adopted, for it prevents drainage.

For these reasons, if we are able to pass a Rheinstadter's curette into the uterus, we prefer to use it to using the vaginal plug.

When the os internum has been opened by one of these methods. If it will admit the finger, then break up the ovum with the finger and squeeze the ovum out of the uterus bimanually.

If it will not admit the finger, it will certainly admit the Rheinstadter's flushing spoon curette.

Repetition. Having decided to empty the uterus, you will ask yourself which of these methods you will use.

1. Should you be able to pass one or two fingers into the uterus, you are able to adopt the best method.

2. If you cannot pass a finger, you must try and pass a Rheinstadter. If a Rheinstadter will not pass, you should

first pass in plugging forceps and open them, thus stretching the cervical canal. Then pass in a small Bozemann's uterine douche and leave it in position for a couple of minutes. The internal os will then permit the passage of a Rheinstadter in many cases. If you decide to empty the uterus, because your patient has had a rigor or has a raised temperature and pulse, it is essential to empty it either with your finger or a Rheinstadter at once. A vaginal plug dams back the putrid uterine secretion and subjects your patient to the danger of severe septic poisoning.

3. Should, however, bleeding have occurred for several weeks, and you are called in for a sudden gush, and on arrival you find you cannot pass a Rheinstadter, then is your time for plugging the cervix and vagina, unless you have Hegar's dilators with you.

Cervical abortion. The treatment of a cervical abortion differs from other kinds of abortion. The trouble is due to a closed external os. The preparations, position, and douching are similar to those described. Pass up sharp-pointed scissors to the cervix, guiding them by two vaginal fingers. The edge of the os externum is knife-like, being stretched over the ovum. Snick this edge in four places, anteriorly, posteriorly, and at either side. The snicks need not be more than one-quarter to one-half inch. Squeeze out the ovum bimanually. Give a hot uterine douche. The hot fluid will stop all bleeding and there will be no necessity to suture the cervix. As an alternative method you can dilate the os with Hegar's and Frommer's dilators. We have found it quite successful in these cases.

MISCARRIAGE AND PREMATURE LABOUR

Miscarriage is the term applied to the expulsion of the ovum from the uterus between the beginning of the fourth and end of the seventh lunar months. Its causes are those of abortion. Sometimes the ovum is expelled entire, more frequently the waters rupture, the foetus is discharged, and the placenta follows or is retained. From a practical point of view there is never the same difficulty in deciding whether or not the miscarriage is complete, as there is in abor-

tion. Both foetus and placenta are too large to escape detection by the patient or nurse, and they are kept to be shown to the doctor. The principles of treatment are the same as those of abortion, namely, to treat as a threatened miscarriage, until either the ovum is expelled or the mother becomes ill.

Miscarriage is not nearly so common as abortion.

Special points of treatment. If the child is born breech first, it not infrequently happens that the os shuts down on the neck and prevents the delivery of the head. To prevent this, directly you feel a foot in the vagina pull upon it. This traction will extend the foetal arms at the side of the head and obliterate the groove of the neck. If the head is caught by the os, pull gently on the legs, but not too hard, for the head may come off at the neck, especially if the child is dead, and then you will have to catch the head with bullet or strong Volsella forceps to pull it through, and this is not always easy. It is better to pass the hand into the vagina and push first one finger and then another alongside the child's neck and dilate the os with the fingers until it is large enough to permit the passage of the head. The second point of treatment deals with the delivery of the placenta. The placenta is apt to be retained. Wait an hour to see if the uterus expels it, and then try to express it by abdominal pressure on the uterus. If this does not succeed, it is better not to wait longer than one hour, for the os closes quickly, and you may have difficulty in getting your fingers into the uterus. Treat the case then exactly as you do an incomplete abortion, and remove the placenta with as many fingers as you can get into the uterus, putting your whole hand into the vagina if you can. The position, vaginal and uterine douching, &c., are exactly as in the treatment of abortion, and the puerperium is to be managed as that after normal labour.

Premature labour. When labour sets in between the beginning of the seventh and before the end of the ninth month, it is called premature labour. The child is viable, that is, it can with great care be brought up. From the point of view of treatment it differs in no way from normal labour. Its causes are the same as those of abortion, with the addition

that, both in twins and hydramnios, premature labour is common. Eclampsia, too, may lead to premature labour.

Death of the foetus. Missed labour. Just as the ovum may die before the end of the third lunar month and not be expelled, so the foetus may die from the third lunar month on and not be expelled. The first is called missed abortion, the second missed labour. The signs of both are the same, namely, cessation of the signs of progressive pregnancy, with perhaps a brown discharge, and the treatment is the same, in one to produce abortion, and in the other to induce labour.

How to diagnose intra-uterine foetal death after the fifth lunar month. You may suspect intra-uterine death when the mother states that she no longer feels the movements of the child and that her abdomen feels cold. A caution is here necessary, for a dead child may roll about in the uterus and produce the sensation of foetal movements, but on being questioned the mother can usually distinguish between this rolling and the lively kicks of the child. Again, if on examination from the sixth lunar month onwards you fail to hear the foetal heart, be suspicious of death of the foetus; but do not mention your suspicions to the mother, for she may develop the cold feelings and dyspepsia that accompany foetal death, owing to your suggestion.

You can make sure by measurements. See first that the bladder and rectum are empty. This you can do by getting her to take a purge, and asking her to pass water before you see her the next day. Then measure the greatest girth round the uterus with a steel tape measure, measure from the ensiform to the top of the fundus and from the top of the fundus to the pubes. Measure her again in a week's time, and, if the foetus is dead, the measurements will possibly be actually less. If you are not sure, measure again in a fortnight, and again in three weeks. Comparing your first measurements with those taken three weeks later, you can be sure whether the foetus is dead or alive. At the same time the breasts become flabby. If a brown discharge appears, it confirms your suspicions. The temperature of the cervical canal is said to be half a degree higher than that of the vagina with living pregnancy, a difference destroyed by death of the foetus.

A dead foetus macerates, and may macerate very quickly. By vaginal examination in missed labour you may be able to feel the loose bones of the skull, and so know the child to be dead.

Very rarely it mummifies, and this may occur with one of twins. The dead twin is crushed by the living twin and forms the parchment-like foetus, foetus papyraceous.

Treatment. No harm will come from waiting, and you can be sure of your diagnosis in three weeks. Sometimes, however, the membranes rupture and the dead foetus begins to putrefy. More rarely putrefaction occurs without rupture of the membranes. Your patient then suffers from a species of blood poisoning; she is ill, and has a rise of pulse and temperature. She also has a brown vaginal discharge. Therefore, as soon as you have diagnosed missed labour, empty the uterus by inducing labour.

How to induce labour. You induce labour first by dilating with tents, and then, if necessary, by adding to the size of the os by digital dilatation.

Dilating with tents. Laminaria tents absorb moisture and expand by its absorption. To sterilize them, cover them with methylated spirits in Jellett's catgut sterilizer and tightly screw the top on. Put the whole into a saucepan of cold water and boil it for half an hour. The tents are thus sterilized in super-heated alcohol, and should be transferred to a bottle.

The preparations for the insertion of tents are the same as those for Hegar's dilators. Hold the tent in a pair of forceps and pass it into the cervix so that its further end projects beyond the internal os. It has to pass for about an inch and a half to secure this. Insert as many small tents as possible side

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Fɪɢ. 55. Laminaria tents in alcohol.

by side, for they are easy to withdraw and you may find great difficulty in getting out a single one. Leave them in for twenty-four hours, keeping your patient in bed. Take them out at the end of twenty-four hours, and you will find the cervix not only dilated, but soft and dilatable.

The soft os produced by tents is an advantage, for you can increase its dilatation by pushing in one and then two fingers. An anaesthetic is not necessary.

Emptying the uterus. The preparations are the same as those described under abortion. The patient is anaesthetized. With your whole hand in the vagina you have pushed your index finger past the internal os. Push the middle finger up alongside it, steadying the uterus with a hand on the abdomen. Then push the thumb up between the index and middle fingers. The size of the os will now suffice for bipolar version (*see* p. 135). Catch the foot of the foetus and pull it gently out of the uterus. After extracting the foetus, remove the placenta with your fingers. Douche the uterus. Put in a long strip of iodoform gauze and remove this in twenty-four hours. The case is then treated like other puerperal cases.

Frommer's dilator or De Seigneur's dilator. If you have one of these instruments, it is useful in these cases, above all if there is any sepsis, in the place of tents. After the usual preparations, pass the dilating end into the cervical canal and very gradually dilate. Dilatation may take considerably over half an hour. Laceration of the cervix is extremely likely to occur with this instrument (and also with forcible digital dilatation). The tear is sometimes dangerously deep and runs up into the body of the uterus, when dilatation has been hurried. Slighter lacerations as a rule heal well.

VESICULAR OR HYDATIDIFORM MOLE

We now come to a special form of abortion, namely, hydatidiform or vesicular mole. In this disease there is a cystic proliferation of the chorionic villi. Consequently the disease must start before the formation of the placenta, namely, before the end of the third lunar month. The cysts look like a lot of irregular beads or little bladders strung together. It is a very rare disease. We have had three cases in hospital in the last three years, out of 5,795 deliveries and abortions, or 1 in 1931.

A theory of vesicular mole. When the impregnated ovum first enters the uterus, it becomes surrounded by large phagocytic cells, called trophoblasts. These trophoblasts eat into the

decidua, as roots eat into a rock, and anchor the ovum.   They cease to exist after the formation of the placenta, becoming differentiated into Langhan's layer and the syncytium.   But in the early months of pregnancy they burrow and eat their way into the decidual tissues.   If the decidual tissues are unhealthy, as in half-starved, profligate, and drunken women, or women affected by syphilis, the trophoblasts of the chorionic villi are not fed as they should be, and they become de-

FIG. 56. Vesicular mole.. (Rotunda specimen.)

generate and cystic.   This is borne out by the fact that the disease is more common in syphilitic and debauched women. Sometimes the trophoblasts eat through the whole thickness of the wall of the uterus, the penetrating vesicular mole. Such infiltration of neighbouring tissue is of a malignant type, and the penetrating mole becomes closely allied to the form of malignant disease peculiar to the puerperium, known as chorio-epithelioma, or deciduoma malignum.

Growth. As a rule, a vesicular mole grows with about twice the rapidity of a normal ovum, so that the uterus of a three months' mole reaches up to the umbilicus.   But some cases of vesicular mole have been reported in which the uterus was actually smaller than in a normal pregnancy.

Signs and symptoms.   The patient misses one or more

periods, and has the symptoms and signs of early pregnancy. She then begins to lose blood or blood-stained watery fluid from the uterus, which escapes at the vulva. The amount of blood she loses is sometimes very great. She may die from a sudden profuse haemorrhage, or she may be so weak and anaemic that the necessary operation of emptying the uterus becomes one of grave peril. In the discharge you may find some of the chorionic cysts. They look like 'white currants embedded in red jelly', and, if you find them, you can be quite sure you are dealing with a case of vesicular mole.

Following the rule, that whenever a pregnant woman bleeds you make a vaginal examination, you examine her, and in addition to the signs of pregnancy you find the uterus is noticeably larger than your patient's history led you to antici- pate, that it has a boggy feel, and that in spite of its size you cannot detect any of the foetal signs of pregnancy. The internal os, if there has been bleeding, may admit your finger, and you may, with luck, hook out some of the cysts. If you do not see the cysts, you make your diagnosis or you suspect vesicular mole by the unusual size of the uterus and its boggy feel. If haemorrhage is not severe and you are uncertain of your diagnosis, keep your patient in bed and have a careful watch set for chorionic cysts in the discharge. If the haemorrhage is severe, it is your duty to empty the uterus, whatever the cause of the haemorrhage may be. Sometimes the uterus itself expels the mole, but you should never wait for this when once you have diagnosed vesicular mole.

How to empty the uterus of a vesicular mole. The prepa- rations are similar to those for emptying a uterus in cases of abortion. If the os will admit one finger, you will be able to dilate it with your fingers. There is one point of im- portance in emptying a uterus of a vesicular mole, namely, that owing to the severe haemorrhage caused by the separa- tion of the cysts from the uterine wall, you should have at least four fingers in the uterus, so as to sweep away the mole quickly. Hence good dilatation of the os is needed. If the loss of blood has not been severe, we use laminaria tents for dilating the os. The softness of the os that they produce

enables further dilatation to be readily effected by the fingers. But if the haemorrhage is severe, and you have to empty the uterus at one sitting, give an anaesthetic and dilate the os internum up to the largest Hegar dilator. If you have no dilator, plug the vagina as you would for accidental haemorrhage. This is a very useful alternative treatment for preliminary dilatation of the os. The plug stops haemor- rhage, promotes labour pains, and makes the os soft and dilatable. After dilatation, put your whole hand in the vagina, and continue dilatation with the fingers. Push in first the index and middle fingers, then the thumb, and separate them. Then push in the third and little fingers. The dilatation must be gradual, for fear of a bad tear of the cervix. Now pass as much of your hand as you can into the uterus and comb away the vesicular mole with semiflexed fingers, pressing the fundus down by a hand on the abdomen. At first you may not reach the fundus, but as the uterus is emptied it contracts and the fundus comes within your reach. You will find removal easy, also that skill lies chiefly in the rapidity with which you effect the removal. You will very likely meet with alarming haemorrhage, therefore immedi- ately you have removed the mole, douche out the uterus with very hot douche fluid (110° to 115° F., or liquid that is uncom- fortably hot to your bared elbow). This will stop the bleeding. Pack the uterine cavity with iodoform gauze, both to form a ball upon which the uterus can contract and to assist drainage. Give the patient two drachms of Squibb's ergot.

Take out the gauze in twenty-four hours. Experience has shown us that bleeding is apt to recur in a few days. Some of the cysts are almost certain to be left embedded in the uterine wall. When haemorrhage recurs, curette the uterus lightly with a Rheinstadter's curette, and replug with gauze. A second recurrence leads to a second curettage. After a fortnight has passed we use a sharp curette. We have had to curette and replug as often as six times before haemorrhage ceased to recur.

Owing to the possibility of chorio-epithelioma, send the scrapings to a competent pathologist for his opinion.

EXTRA-UTERINE PREGNANCY

When the ovum is implanted outside the uterine cavity, separation from its attachment, homologous to abortion, is bound to occur. Extra-uterine pregnancy is from a practical point of view synonymous with tubal pregnancy. It is true that cases of ovarian pregnancy and pregnancy arising at the fimbriated end of the tube are on record. When they occur, they do not differ clinically from abdominal pregnancy due to the breaking away of the living ovum from the tube and its continued growth in the abdominal cavity. So, too, pregnancy may occur in a uterine horn or in the interstitial (intra-uterine) part of a normal Fallopian tube. Two things may happen, either the ovum may burst into the uterine cavity, in which case it cannot be diagnosed without laparotomy, or post-mortem examination, from an ordinary abortion, or it may burst into the peritoneal cavity, in which case it is clinically a case of tubal rupture and its peculiar nature is only discovered at the laparotomy or post-mortem. Clinically, therefore, all cases in which the ovum is nourished outside the uterine cavity are cases of tubal pregnancy, with the exception of those rare cases in which the ovum bursts into the uterine cavity and resembles an ordinary abortion.

Tubal pregnancy, from a practical point of view, may be grouped into four classes—(1) tubal pregnancy before rupture, (2) ruptured tubal pregnancy leading to severe internal haemorrhage, (3) ruptured tubal pregnancy leading to an encysted blood tumour, (4) ruptured tubal pregnancy, in which the ovum survives rupture and continues to live either between the layers of the broad ligament or in the abdominal cavity.

Cause of tubal pregnancy. No one really knows why the ovum, which is fertilized in the Fallopian tube, should grow in the tube instead of in the uterine cavity. Probably the cilia of the epithelium lining the tube are missing and so the ovum fails to be pushed along by them into the uterus. Not uncommonly a long period of sterility precedes a tubal pregnancy. The patient has a child, is sterile for ten years and then develops a tubal pregnancy. Such a history is of

some little positive value, but too much stress must not be laid on it. We once operated on a patient for sterility, untwisted her twisted tubes, and passed a fine probe down them. She came back to us with a tubal pregnancy.

Course of a tubal pregnancy. The ovum gets implanted by trophoblasts into the wall of the tube, just as it does into the uterine wall. The tubal wall forms a decidua, but its decidua is feeble and separation of the ovum from it readily takes place with haemorrhage, strictly comparable to the separation that precedes abortion. This separation may lead to *death of the ovum*, comparable to a missed abortion, which *may then be absorbed* and so the matter end. Or blood may invade the ovum and *a tubal mole*, comparable to a uterine carneous mole, result. A tubal mole, again, may be absorbed and no more trouble result. These sequelae of tubal pregnancy are not serious. Unfortunately they cannot be foretold, and, therefore, from a practical point of view, they are overwhelmed by the more serious sequelae. If the ovum is lodged near the fimbriated extremity of the tube, it may be squeezed by the peristaltic action of the muscle of the tube into the peritoneal cavity, the *tubal abortion*. Tubal abortion, however, is accompanied by so much haemorrhage that clinically it is the same as tubal rupture. *Tubal rupture* results in the following way: The trophoblasts erode and the growing ovum distends the tube, so that the tube ruptures commonly in the second or third lunar month of pregnancy or even before this. Two-thirds of the tube is enclosed by peritoneum and one-third by broad ligament tissue. Two-thirds of the tubal ova escape into the peritoneal cavity and one-third between the layers of the broad ligament. Severe haemorrhage may attend rupture, rapidly leading to the death of the patient. This is especially the case when the blood escapes into the peritoneal cavity. Less haemorrhage leads in the one case to a collection of blood in Douglas's pouch, a *pelvic haematocele*, in the other case to a collection of blood between the layers of the broad ligament, a *pelvic haematoma*. Still less haemorrhage may scarcely affect the patient constitutionally, but permit of the escape of a live and partly separated ovum either into the peritoneal cavity or between the layers

of the broad ligament. In the first case the ovum continues to live in a false sac formed by bowel, omental and peritoneal adhesions, until full term, when spurious labour sets in and results in the death of the foetus. In the second case the foetus continues to live in a false sac formed by the layers of the broad ligament. Then either the secondary sac ruptures —usually about the fifth or sixth lunar month of pregnancy—with severe haemorrhage, in marked contrast to the initial rupture that has such a slight constitutional effect on the patient that it excites no alarm, or the foetus continues to live to full term, when spurious labour sets in, resulting in the death of the foetus.

Any of these sequelae may be preceded by minor haemorrhages, which make the patient pale and give her griping, colicky pains in her lower abdomen. Practically, as we have asserted, they can all be grouped into four groups—(1) tubal pregnancy before rupture, (2) ruptured tubal pregnancy leading to severe internal haemorrhage, (3) ruptured tubal pregnancy leading to encysted blood tumour, (4) ruptured tubal pregnancy, in which the ovum survives and continues to live either between the layers of the broad ligament or in the abdominal cavity.

1. **Tubal pregnancy before rupture.** Irregular haemorrhage from the uterus escaping at the vulva is the usual sign that causes your patient to ask your advice. Sometimes she comes because of colicky pains. She may or may not think she is pregnant and the fact that irregular haemorrhage may occur almost from the start confuses and discountenances any menstrual history. She may have morning sickness and her breasts may be full, and this may lead you to suspect pregnancy. So that irregular haemorrhages in a married woman, especially when accompanied by colicky pains, are signs of importance and will lead you to make a vaginal examination. The haemorrhages are due to gradual and imperfect separation of the uterine decidua, which is formed at the same time as the tubal pregnancy. More rarely, a complete cast of the decidua is expelled from the uterus. It may be expelled before rupture, though more commonly it is expelled at the time of rupture. A complete cast looks

like a little triangular jacket with three holes in it, one at
the os internum and one at the mouth of either Fallopian
tube. It is smooth on one side and shaggy on the other.
This cast is expelled with pain and uterine haemorrhage.
Your patient may keep it for you, thinking she has had
an abortion. It is strong, but not final, evidence of tubal
pregnancy. In addition to this haemorrhage and expulsion
of decidual membrane, she will sometimes tell you she has
been taken with sudden colicky pain in the lower abdomen,
which may be so severe as to make her sick and faint. Always
be on your guard against tubal pregnancy, when a married
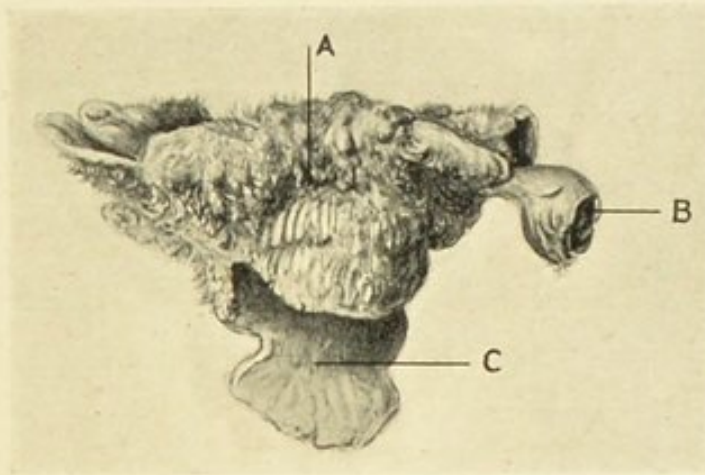
FIG. 57. Decidual cast of the uterus. A, shaggy external surface ; C, smooth
internal surface ; B, small interstitial ovum. (Rotunda specimen.)

woman complains to you of an altogether unexpected bout of
colicky pain, which made her pale, sweat, sick, and faint.

Therefore, if your patient comes to you complaining of
haemorrhage or a sudden attack of colicky pain of an
unexpected nature, you will be wise to ask her to let you
make a vaginal examination. The need of doing so is still
more imperative if there is any reason to suppose she is
pregnant.

**Diagnosis of unruptured tubal pregnancy by vaginal
examination.** You find a *tender*, elastic lump either behind
or to the side of the uterus. You may also feel pulsation of
vessels over it, but you will often feel the ovarian vessels
pulsate, if there is a tumour lying behind them. This tender
swelling is separated from the uterus by a groove. The

uterus itself is a little larger than normal and the cervix may be beginning to get soft.

This lump may be either an ovarian cyst or tube filled with fluid contents from causes other than pregnancy, or a fibroid, but none of these are tender as a rule nor are they accompanied by a history of irregular haemorrhage or colicky pains. Nor practically speaking should they be considered, for if you suspect the lump to be a tubal pregnancy, operation to remove it should be your treatment. If you are mistaken and find a
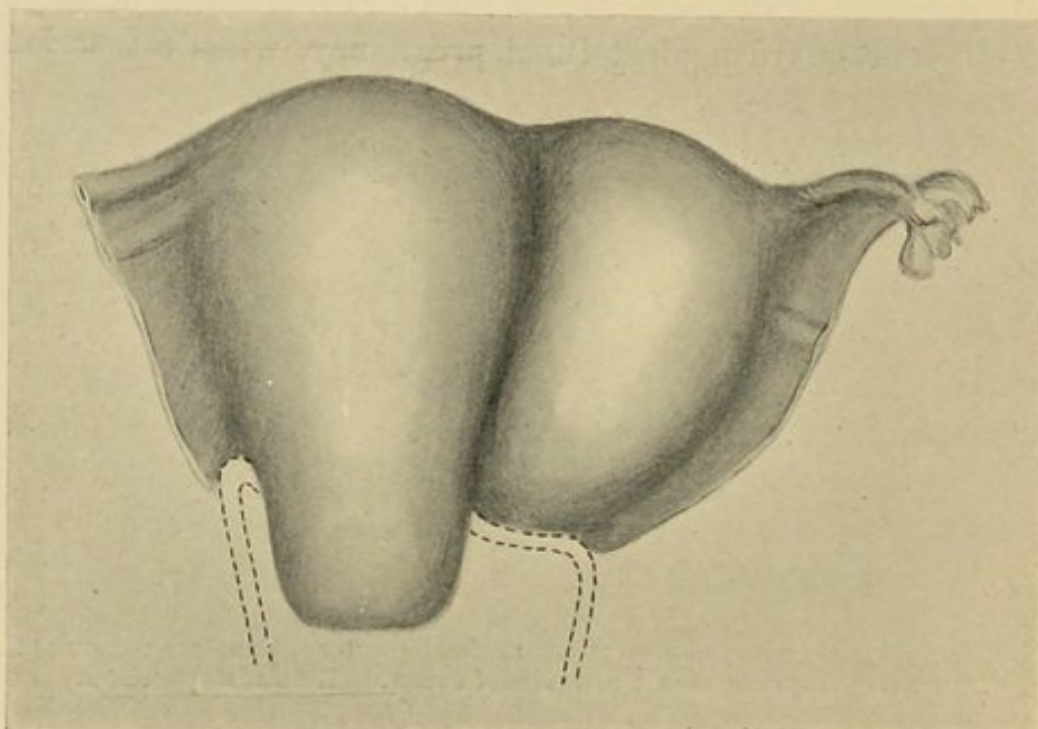
Fig. 58. Tubal pregnancy as felt by vaginal examination.

distended tube or ovarian cyst, by removing them you do your patient good.

You may think your patient has only a threatened abortion, but you will not commit this blunder if you always make a vaginal examination, when a woman comes to you on account of haemorrhage.

A serious error is to mistake a tubal pregnancy for a retroverted gravid uterus. If you are in any doubt, you must put your patient under an anaesthetic. Examine carefully, for a tubal pregnancy has been ruptured by a too vigorous vaginal examination. Attend to the following two points: (1) you will find the body of the uterus, by bimanual palpation,

like a hard walnut-sized knob pushed up against the pubis or to the side of the soft doughy tumour; (2) although the cervix is pushed forward, the anterior vaginal wall is not stretched, as it is in retroverted gravid uterus.

If you make the mistake and attempt to anteflex a tubal pregnancy, under the belief that you are dealing with a retroverted gravid uterus, you are exceedingly likely to cause rupture with immediate dangerous and perhaps fatal haemorrhage. The same applies to mistaking a pelvic haematocele for a retroverted gravid uterus, and the same distinguishing signs apply.

Treatment of tubal pregnancy before rupture. All obstetricians are now agreed on the treatment of tubal pregnancy before rupture. It is to perform a laparotomy as soon after diagnosis as possible and remove the tube with the living ovum. The steps of the operation are the same as that for ruptured tubal pregnancy. Avoid a large enema before the operation.

2. **Ruptured tubal pregnancy leading to severe internal haemorrhage.** Rupture of a tubal pregnancy in the majority of cases leads to the death of the mother from internal haemorrhage. There is no need for further emphasis on the need of immediate laparotomy when tubal pregnancy is diagnosed before rupture. Death may follow rupture with great rapidity. We know of a lady who, whilst putting up her hair, turned pale and faint. Her husband put her back to bed, and she died within half an hour of being in perfect health. Such cases are by no means uncommon.

Diagnosis of ruptured tubal pregnancy with internal haemorrhage. Rupture usually takes place within the first three lunar months of pregnancy, but the secondary rupture from within the layers of broad ligament may take place any time during the later months of pregnancy, usually, however, before the sixth lunar month. Secondary rupture in these cases corresponds clinically with ordinary primary rupture, for the rupture that leads to the original escape of the ovum is not accompanied by sufficient haemorrhage to kill the ovum, that is to say, the haemorrhage and symptoms due to it are slight.

You may then get a history of some weeks of pregnancy, with perhaps colicky pains and irregular slight haemorrhage. But the clinching fact of diagnosis is the sudden onset in a woman apparently healthy of the signs of internal haemorrhage. So convincing is this, that if you diagnose ruptured tubal pregnancy you will rarely be wrong.

You find your patient very white, in great pain, and collapsed. A little blood and possibly a decidual cast may have escaped from the vulva, but the signs of haemorrhage are out of all proportion to this loss. The patient's pulse is very soft and rapid and her temperature subnormal. The blood poured into the peritoneal cavity or stretching the layers of the broad ligament is the cause of the severe pain, and for the same reason she may have vomiting, hiccough, and hard abdominal muscles.

She is in great anxiety about herself, and if she is near death she will be restless and try to get up from the bed.

Treatment when there is haemorrhage threatening death. There is but one treatment, and that is immediate laparotomy. Some advise an interval in which the patient is recovered from shock. But during this interval more blood may be escaping, so that even if the patient is moribund we advise immediate operation. The operation is an easy one.

(Fortunately, however, this extreme hurry amidst unprepared surroundings is rarely called for, and only required in those cases where continuous haemorrhage is quickly robbing the patient of her life. You usually have time to prepare your patient and get skilled assistance.)

Preparation of the patient. You will not have time to undertake the careful preparation we advise under Caesarian section. Both in the operation for unruptured and for ruptured tubal pregnancy, speed is more essential than absolute surgical cleanliness.

The operation. Get a table, fold some blankets on it, and cover it with a mackintosh. Put some oilcloth or other material under the table to save the carpet. Place the table where there is a good light. Shave the pubic hair whilst the patient is in bed, and wash the abdominal skin well with soap and water. Wash off the soap and water with clean water.

Soak a clean towel from the wash in biniodide of mercury (1–1000) and lay it on the abdomen. Cover the patient with blankets, and get some one to put hot bottles (not so hot that they will burn) near her to keep her warm.

Then get ready your own instruments. You will want a scalpel and two clamp forceps, a needle, and some sutures. These are all the instruments that are absolutely necessary. Put the patient on the table. Inject gr. $\frac{1}{20}$ of strychnine into her arm. Then inject a solution of eucaine, which can be boiled, along the line of your incision. You can inject 50 to 100 cc. of the 2–1000 solution of eucaine. It acts better if you inject 10 minims of Parke Davies' adrenalin with it (*B. M. J.* ii. 1904). You have to wait ten minutes whilst the eucaine acts, during which you can get a hot douche ready and scrub your hands. If you have no eucaine you must put her under chloroform, and direct some one to continue it.
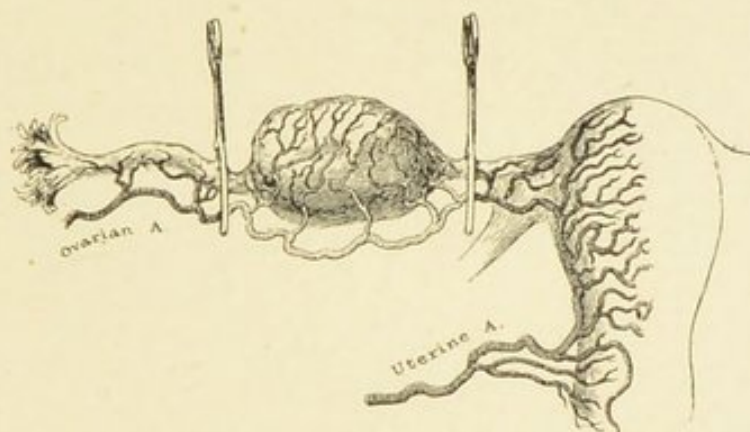
FIG. 59. Position of clamps in operation on ruptured tubal pregnancy.

Having washed your hands, throw back the towel wrung out in biniodide. Cut down the middle line for four inches, ending your incision about half an inch above the pubic bone. Pass your hand down to the uterus and feel for the groove between the uterus and the tumour of the tubal pregnancy. Pass the clamp along this groove and clamp. Then feel the groove external to the tumour and clamp along that. Insert the nozzle of your douche into the abdomen and wash the peritoneal cavity free of blood, with hot saline solution (ℨj to Oj). Leave some of the saline in the abdominal cavity.

See that bleeding has stopped. If not, reclamp and put on other clamps if you have them. Several Spencer-Wells or Kocher's forceps will do in an emergency. Bring the ends of the clamps out of the abdominal wound and sew the wound up with your sutures, or close it with two bullet forceps. Cover the wound over again with the towel soaked in biniodide of mercury. Put another towel from the wash over this. Hold them on with a binder. She will rally quickly if the bleeding has stopped.

The immediate operation is finished. Now set to work to rally your patient from collapse with injections of ether, brandy, digitalin, strychnine, and six ounces of black coffee per rectum. You have left in some two or three pints of saline, so you need not infuse her. Keep her warm. Send, too, for a colleague and nurse to help you. Ask your colleague to bring other instruments that you will need, some more clamps, some Nos. 2 and 4 Japanese silk, a blunt curved needle, scissors, dissecting forceps, and some gauze wipes.

Then, when all is ready and your patient has rallied from collapse, get your colleague to give her an anaesthetic, and the nurse to disinfect her hands and help you.

Reopen the wound. Pass the curved needle threaded with silk round the tissue your outer clamp has caught, and tie it firmly with a double reef knot. Cautiously loosen the clamp and see that bleeding does not recur. Do the same to the tissue between the uterus and the tumour. Remove the ovum if it has escaped into the abdominal cavity. Shell out the ovum if it has escaped between the layers of the broad ligament. In secondary rupture more bleeding may follow removal of the placenta, which you must stop by packing the gap with iodoform gauze. Anyhow, sew up the rent in the tube caused by the rupture, passing your sutures deeply into the substance of the broad ligament. Douche out the peritoneum with hot saline again. Examine the area of your operation again to see that all bleeding has stopped. See that the ligatures are firm and cut their ends short with scissors. Leave two pints of saline in the peritoneal cavity. Close the abdomen by suturing first the peritoneum with continuous fine silk, then the aponeurosis of the rectus muscle

with fine silk, and the skin with interrupted salmon gut, and by the method described under Caesarian Section.

You should, of course, if you have necessary instruments and assistance, carry out the complete operation under the first anaesthetic. Take out the skin sutures on the eighth day and allow your patient to get up, if all is well, at the end of the third week. For further details of after-treatment, see under Caesarian Section, pp. 314–319.

The rare case of rupture of an interstitial pregnancy. This nearly always bursts into the uterus. If it does not, and you find at the operation that you have a case like this and cannot tie the tube, you must sew up the rent with catgut or silk to stop the bleeding.

3. **Ruptured tubal pregnancy leading to an encysted blood tumour.** Sometimes the bleeding due to a ruptured tubal pregnancy is not as severe as this. The patient may have some pain and is a little pale, but her symptoms at the time of rupture may not even be urgent enough for her to send for the doctor. More frequently, however, urgent symptoms arise, but they may not frighten the patient sufficiently to send for her doctor. She may think she has bad indigestion. There is some vaginal haemorrhage as well, from separation of decidua. She recovers from her feeling of faintness, and then in a day or two a reactionary temperature occurs, and she still has hypogastric pain. She then sends for her doctor.

You make a vaginal and bimanual examination, and if there has been time for some of the blood to clot you will feel a solid or semi-solid tumour, either behind the uterus in Douglas's pouch or to the side of the uterus, between the layers of the broad ligament. If the blood has not clotted you may only feel that in the one case Douglas's pouch bulges the posterior vaginal wall, and in the other the blood in the broad ligament bulges the lateral vaginal wall. The first is called a pelvic haematocele, the second a pelvic haematoma. A large haematocele may sometimes be felt abdominally as an ill-defined tumour reaching perhaps up to the umbilicus. You also find present the early signs of pregnancy, and your patient may tell you she thought she was pregnant.

The one thing you must carefully distinguish a pelvic haematocele from is a retroverted gravid uterus, for if you think it is a retroverted gravid uterus and try to replace it, you are quite likely to rupture it and lead to the death of your patient. Distinguish it by two signs: (1) you feel the uterus pushed up against the pubic bone or a little to one side, (2) although the cervix is pushed against the pubic bone, the anterior vaginal wall is not stretched.

Treatment. When a pelvic haematocele or haematoma forms, you can from the practical point of view be sure that the ovum is dead.

There are two treatments open to you, one is the expectant, the other operative.

Expectant treatment. You keep the patient in bed and attend to the normal functions of the body. At first she may have pain, for which you can give opium in some form. She will often turn a nasty yellow colour, frequently has a temperature, feels weak, and has a bloody vaginal discharge. Whilst she has a temperature keep her on liquid diet. Give her laxatives, if they are needed. Eventually during this treatment the blood clot absorbs and the patient gets well, but it may take several months. You have to make vaginal examinations to see that the tumour is shrinking and not increasing. More rarely it alters very little in size, and if it does not alter for a fortnight, and the patient seems well, you can let her get up.

But there are distinct disadvantages to this treatment. The time required for it is long, and is apt to seriously harm a woman's estimate of her own strength and make her an invalid. The blood may be infected and an abscess form, which either is opened by you or else bursts into the vagina, the bowel, the rectum or the bladder, results which are obviously undesirable.

Nor is it always easy to tell when suppuration is occurring, for without suppuration a temperature is frequent. If the patient gets worse from day to day instead of better, suppuration is very likely taking place. A leucocyte count of over 18,000 is strongly in favour of pus, but a leucocyte count requires experience for accuracy.

On the whole, therefore, we recommend operation, and operation is imperative (1) if the tumour increases in size or there are other signs of further bleeding, such as attacks of pain accompanied by pallor or fainting, (2) if difficulty in passing water occurs from pressure of the blood tumour, (3) if you think suppuration has occurred.

Operative treatment. In the first two cases, that is, when there are signs of further bleeding or pressure on the bladder, following the preparations described under Caesarian Section, open the abdomen in the middle line by an incision of some three inches, extending to the pubic bone. Empty the blood sac of its clots. You cannot get rid of all the clots, but get rid of as much as you can by lifting them out with your fingers and swabbing them out with gauze wipes. Then douche out the cavity left with warm saline. If there is oozing pack the cavity with iodoform gauze, leaving the end projecting through the wound. This is seldom necessary. Close the rest of the wound in three layers and withdraw the gauze within twenty-four hours. The operation is easy, and if carried out with aseptic precautions is safe. By it convalescence is limited to the time needed to recover from the operation, which is from a fortnight to three weeks.

In the third case, when pus has formed, it is better to open the abscess from the vagina. Open the abscess by an incision in the vaginal wall, after the vagina has been well douched. Make your incision about an inch long over the bulged vaginal wall. You will be able to see this, by inserting a posterior speculum, the patient being in the cross-bed or gynaecological position. Put a pair of bullet forceps on the posterior lip and steady the cervix whilst you make the incision. Insert one finger into the abscess and clear out the breaking-down clot. Douche out the cavity either with creolin ($\tilde{3}$ss. to Oj) or warm saline, under low pressure, not having the can or jug more than two feet above the bed. Lightly stuff the cavity with iodoform gauze and leave it in for twenty-four hours. Next day, without anaesthesia, again lightly pack the cavity, and continue this treatment daily until the abscess cavity has shrivelled up and you can get in no gauze. It does not as a rule take many days to do this.

Warm vaginal douches at the same time keep the vagina clean.

4. Ruptured tubal pregnancy, in which the ovum survives and continues to live either between the layers of the broad ligament or in the abdominal cavity. We have already dealt with secondary rupture of broad ligament pregnancy.

We cannot speak from experience of these cases, for we have not yet met with one. The diagnosis is made by feeling foetal parts in a tumour that is not the uterus, but displaces the uterus, which can be felt separately from it. Spurious labour sets in about full term, a decidual cast is expelled from the uterus and the foetus dies. After this, but not before, it is permissible to pass a sound to make sure of the diagnosis. The foetus may then wither, macerate, or become hardened by a deposit of calcium salts into a lithopaedion. A woman has been known to carry a lithopaedion for forty years, but this is a very unlikely chance. Sooner or later the foetus and foetal sac become infected and suppuration occurs. The abscess may burst into the peritoneum and cause death from general peritonitis. More commonly it bursts into the bowel, bladder, uterus, or vagina. In any case it leads to continued irritation and discharge of pus. It exhausts the strength of the patient and kills by toxaemia or lardaceous disease.

Treatment. To avoid the appalling haemorrhage that arises from pulling away the placenta, whilst the foetus is alive, you are advised to wait for three weeks after spurious labour has set in. Then open the belly and remove the whole sac as far as possible. If an abscess, open it from the belly, pack it round with gauze, and clean out its contents and drain. Modern surgeons try to save the child's life by laparotomy before full term. Lusk, in one case, opened the sac and removed a live child. He then tied the ovarian artery, as forming the principal artery of supply to the placenta. He pulled away the placenta, plugged the cavity with iodoform gauze, stopped the bleeding in this way, and thus saved the lives of both mother and child. If we had a case, we should be inclined to try and repeat this success of Lusk's.

HYDRORRHOEA GRAVIDARUM

Watery discharge, which may or may not be tinged with blood, in rare cases flows from the pregnant uterus. It is thought to be due to a catarrhal endometritis with excessive activity of the glands. The decidua reflexa does not meet and unite with the decidua vera, until the end of the third lunar month of pregnancy. The space between them is known as the decidual space, and it is from the decidua lining this space that the fluid is supposed to come. This space is thought to be kept open by the fluid throughout pregnancy.

Symptoms and signs. The continuous dribbling of fluid distresses the patient, and she has always to wear a diaper. In the later months of pregnancy, the fluid sometimes collects in the uterus and comes away in gushes, accompanied by uterine contractions. Naturally your patient thinks her waters have broken, and she is going to have a miscarriage. These gushes may be repeated during the later months of pregnancy.

Diagnosis. In the early stages you have to diagnose hydrorrhoea from abortion, vesicular mole, or extra-uterine pregnancy. This you can do by making a bimanual examination. The fluid that is discharged, when abortion is threatening or there is extra-uterine pregnancy, is not watery but blood. That from vesicular mole may be watery, but it does not stiffen linen, whereas the fluid of hydrorrhoea gravidarum does.

In the later months you have to diagnose it from premature rupture of the membranes. You cannot tell by the nature of the fluid, for it is very like liquor amnii. But the other signs of labour are absent and you have the history of previous dribbling of fluid, and you can feel moreover that the membranes are unruptured.

Treatment. No treatment is of any avail. There is no danger to the mother, so you can make her happy about herself. She will often go to full term, although the weeping continues. Six weeks after labour you can treat the uterus for endometritis.

POLYPUS

A polypus projecting through the external os may cause bleeding when the woman is pregnant. You can diagnose polypus either by touch or looking at it through a Fergusson's speculum. Twisting it off with forceps is the treatment, and can be done without an anaesthetic.

CANCER

Cancer of the cervix may be the cause of bleeding in a woman who is pregnant. The diagnosis is made in the same way as cancer in a non-pregnant woman. Labour, if allowed to result at full time, is likely to be fatal from sepsis or to be followed by increased malignancy of the growth. The mother's life must be saved and the life of the foetus sacrificed by complete extirpation as early as possible (*see* p. 174).

TABLE OF DIFFERENTIAL DIAGNOSIS

Nature of Discharge	*What is felt by Vaginal Examination*
Abortion.	
Bits of ovum may be found. When put in water chorionic villi float out like sea-weed and are decisive.	A patulous os and dilated cervix, unless the case is one of cervical abortion. Size of uterus corresponds to history.
Extra-uterine pregnancy.	
A decidual cast of the uterus may be found. Or bits of decidua without any foetal membrane are found.	A tender, egg-shaped tumour is felt either behind or to the side of the uterus.
Vesicular mole.	
In the discharge may be found the white currants embedded in red jelly. The discharge is watery and blood-stained, but does not stiffen linen.	The uterus is larger than the period of pregnancy indicates. It is round and boggy.
Hydrorrhoea gravidarum.	
The discharge is watery, continuous, or in gushes, and stiffens linen.	Simply a pregnant uterus. The membranes are unruptured.
Polypus.	
The discharge is bloody.	The polypus is felt. It is seen through a speculum.
Carcinoma of the cervix.	
The discharge is bloody, watery, or purulent. If there is definite ulceration it may be foetid.	A hard induration or ulcer on the cervix is felt. Through a speculum the cancer is seen.

ACCIDENTAL HAEMORRHAGE AND PLACENTA PRAEVIA

We have now to deal with separation of the placenta causing bleeding in the last four lunar months of pregnancy. The child is now viable.

If bleeding occurs from separation of a normally situated placenta, the condition is called accidental haemorrhage; if from an abnormally situated placenta, it is called placenta praevia or unavoidable haemorrhage.

What is a normally situated placenta? On looking at a picture of a vertex presentation with an undilated internal os, it is seen that the head lies in a shallow cup formed by the lower part of the uterus. The cup extends from the internal os to the height of the greatest diameter of the child's head. All this cup being below the greatest diameter of the child's head will have to dilate, so that the head may pass. Nature has provided for this event of dilatation by giving the lower segment thin walls and scanty muscular tissue, compared to the upper segment, which has thick muscular walls to drive the child down. The rim of this shallow cup, or the border of the upper segment, which separates the upper and lower segments, is known as Bandl's ring, and has been demonstrated by frozen sections. It is quite distinct from the internal os. It is the lower border of the retracted and contracted upper uterine segment, and hence it is vital and not anatomical. It can be seen and felt in life in cases of obstructed labour.

A placenta situated above Bandl's ring or border is a normally situated placenta. Its premature separation, when this occurs in the last four lunar months of pregnancy, leads to the condition known as accidental haemorrhage. A placenta situated either in part or wholly below Bandl's ring is an abnormally situated placenta, and its premature separation is inevitable and leads to unavoidable haemorrhage, namely, the the haemorrhage of placenta praevia. The placenta is called praevia on account of its being in advance of the largest diameter of the head.

ACCIDENTAL HAEMORRHAGE

Causes. Any cause that leads to an unhealthy or diseased decidua may cause an unhealthy or diseased attachment of the placenta. Hence endometritis, Bright's disease, disease of the arteries or blood, debauchery, drunkenness, all render a pregnant woman more liable to premature separation of the ovum, leading to abortion, miscarriage, or accidental haemorrhage. A fall or similar accident may be the determining cause, but healthy pregnant women have sustained very severe injuries without separation of the placenta.

Danger to the patient. The occurrence of accidental haemorrhage is one of grave danger to the patient. In our experience it is, next to sepsis, the greatest risk a pregnant woman runs.

Two kinds of accidental haemorrhage. Accidental haemorrhage is divided into concealed and revealed. In the first the blood is retained in the uterus, in the second it escapes at the vulva. The first is very rare and exceedingly fatal. Often some blood runs out from the vulva and some is retained in the uterus. Some may be shut back behind the fixed presenting part if labour starts.

Concealed accidental haemorrhage.

Definition. Concealed accidental haemorrhage may be defined as an accidental haemorrhage, which leads to sufficient haemorrhage to cause constitutional symptoms without any blood issuing at the vulva.

Reason why the blood does not escape. Possibly the blood may be retained behind the placenta, owing to the firm adhesion of the placental margin. Possibly, too, the blood may be effused between the uterine wall and the foetal membranes, and be retained by the firm adhesion of the membranes to the internal os. But what you actually find in concealed accidental haemorrhage is that the uterine muscle is enfeebled and made flabby by its degeneration from disease. As the blood is poured out this muscle readily yields, and so more blood is poured out. If the uterine muscle is healthy it does

not yield, and consequently the blood either escapes at the vulva or bleeding ceases. It is this degenerate condition of the uterine muscle that makes concealed accidental haemorrhage so excessively fatal. There is no hope that the bleeding will stop unless the uterus has tone and can contract, and it is this loss of tone that leads to the haemorrhage being concealed.

Symptoms and signs. Owing to the fact that the patient does not see any blood, symptoms and signs are as a rule well advanced by the time you see her. She has all the symptoms of haemorrhage. She is very white and collapsed. Her pulse is small and rapid. She is thirsty, anxious, and restless. The distension of her uterus with blood causes her very severe pain of a tearing nature. She may tell you she has noticed that her stomach has become bigger in the last few hours. When you lay your hand on the abdomen you find the uterus is large, round, tense, and tender.

Treatment of concealed accidental haemorrhage. Concealed accidental haemorrhage is such a rare occurrence, as well as such a desperate condition, that no good treatment has been discovered Our last case, a drunken multipara who had been hurt in a drunken brawl, we treated first by plugging the vagina, as in revealed haemorrhage, and then attempted to rally her from shock, but she died within a few hours of admission. As the loss of muscular tone is the cause of danger and the stretching of the muscle still further impairs the feeble muscle, rupture of the membranes to allow of exit of the blood, followed by plugging of the vagina, as described under revealed haemorrhage, may be tried.

To rupture the membranes. Put the patient in the cross-bed position, douche the vagina, put a bullet forceps on the anterior lip of the cervix and pull it down. Then guide with your finger a sterile catheter stylet through the cervix and rupture the membranes. If blood does not pour out, push a bougie into the uterus in different directions. When the blood has escaped, again give a hot vaginal douche, and plug the vagina (*see* p. 125); inject $\frac{1}{2\delta}$ of a grain of ergotine citrate deeply into the buttocks, and treat the patient for collapse.

As an alternative you may empty the uterus by vaginal

Caesarian section. Both abdominal Caesarian section and hysterectomy are hopelessly fatal.

How to perform vaginal Caesarian section. The patient lies in the cross-bed position under an anaesthetic. Douche the vagina and empty the bladder.

Put in a large posterior speculum. Put bullet forceps on either side of the os and get your assistant to draw the cervix down. Then take sharp-pointed scissors and cut through the roof of the anterior fornix close to the uterus. Push one finger up through this cut in the vaginal mucous membrane and separate the uterus from the bladder, so that when you cut the cervix you can be sure you will not cut the bladder. Insert one blade of the scissors into the cervix and slit it up anteriorly in the middle line up to the internal os. Remove the bullet forceps and speculum. Split the posterior cervical lip in a similar manner, if by so doing you can expedite delivery. Then put your hand through this cut into the uterus, catch a leg of the child and extract it. Manually remove the afterbirth and douche out the uterus with a hot douche to stop the bleeding. Reinsert the posterior speculum and pull down the cervix with bullet forceps. Sew up the cut in the cervix with catgut. Again douche the uterus and plug it with iodoform gauze.

Revealed accidental haemorrhage.

When the blood escapes from the vulva, you have to diagnose between revealed accidental haemorrhage and placenta praevia.

Diagnosis between revealed accidental haemorrhage and placenta praevia. This is simple. When there is haemorrhage the internal os is nearly always patent enough to admit one finger. You make a vaginal examination, with the usual precautions. It is better to try and get your half hand into the vagina, for you may have difficulty in reaching the os with only two fingers. Then pass one finger into the os. In placenta praevia you feel the placenta. If the placenta lies directly over the internal os, you feel its thick spongy substance between your finger and the presenting part. If it does not do so, you feel its edge. You may mistake blood

clot for placenta, but not if you press it with your finger, for you can break up blood clot by pressure, but not the placenta. If you cannot feel the placenta, you treat the case as one of accidental haemorrhage.

Danger of revealed accidental haemorrhage. The amount of blood lost may be slight and, unlike placenta praevia, there is no inherent necessity for the bleeding to be repeated. But revealed accidental haemorrhage is, as a rule, a very serious condition. During the last three years at the Rotunda we have had twenty-seven intern and nineteen extern cases, of which seven have died. We are accustomed to divide the cases into those with labour pains and those without labour pains. In the first the outlook for the mother is favourable, but when bleeding occurs without labour pains, the patient's life is in the gravest peril.

Treatment for revealed accidental haemorrhage. The patient does not die from a loss of red blood corpuscles, but from loss of fluid. In other words she dies from collapse, the pathology of which is loss of fluid.

Treatment, therefore, resolves itself into (1) stopping the bleeding, (2) the treatment of collapse.

Methods of stopping the bleeding. So many methods have been devised to stop the bleeding that probably none are wholly satisfactory. The principal methods that have been advised are—

1. *Rupture of the membranes.* The disadvantage of this is that it leads to prolonged labour ; a most undesirable thing when the placenta is partly separated.

2. *Rapid delivery.* The os is dilated by the hand, by Frommer's dilator, or by vaginal incision, and both child and placenta quickly delivered. Experience is distinctly against this treatment.

3. *Turning.* Turning, which is a most valuable treatment in placenta praevia by causing pressure of the foetal half-breech on the bleeding points, has nothing to recommend it as a treatment for accidental haemorrhage.

4. Caesarian section has been adopted by some authorities.

Rotunda treatment. In the face of these difficulties have we any better treatment to offer ? We claim that we have.

The treatment by plugging the vagina, reintroduced by Sir William Smyly during his Mastership of the Rotunda, has met with far greater success than any other treatment. From November, 1889, to November, 1893, fifty-six cases of accidental haemorrhage were treated, and in all serious cases accouchement forcé was adopted. Six patients died (Jellett). In the last four years thirty-nine cases of accidental haemorrhage have been treated in the hospital. In these, plugging the vagina was undertaken only in the most serious—in twelve cases; two of these died, one being a case of concealed accidental haemorrhage. We would insist that statistics of accidental haemorrhage as a whole are misleading, and that these twelve cases belong to that group, so entirely apart from trivial cases, which all must own has a very high mortality.

Cases in which vaginal plugging is not adopted. In only two classes of cases do we not plug: (1) When the head is fixed by its largest diameter in the brim and the os is fully or nearly fully dilated. Then we put on forceps, deliver the child, and either express or manually remove the placenta. We then give a hot intra-uterine douche, for fear of post-partum haemorrhage, which not infrequently follows accidental haemorrhage. (2) When, owing to the presentation of the child and the dilated os, we can bring down either one or two legs and deliver the child rapidly. We then treat the case as after delivery by forceps. Some say that plugging of the vagina is contra-indicated, when the membranes have ruptured. They say this because they think plugging stops the haemorrhage by raising the internal pressure, and therefore more blood must be poured out into the uterus to take the place of the escaped liquor amnii, in order that the same intra-uterine pressure may be attained. Practically, we have found plugging quite as efficient after as it is before rupture of the membranes.

Plugging the vagina. In the great majority of cases you are called before the os is sufficiently dilated to permit of rapid delivery of the child. In such cases the child is viable, and we advise you, without exception, to treat them by plugging the vagina even though haemorrhage is slight. Unless the case is in a hospital, we do not advise prophylactic

treatment, for fear a more severe haemorrhage should set in after you have left the patient's house.

If you plug the vagina properly, especially in relation to the cervix, we assure you that bleeding will cease, and you will be able to devote your time to restoring your patient from collapse. There is, however, one word of warning needed, namely, that vaginal plugging causes shock and your patient will not respond to your attempts to restore her, as well as you might wish, until the plug is removed. If the plug is not rightly and tightly inserted, it does no good, and the sign of this will be that blood will ooze through it. If this occurs, you must take it out and replug.

How to plug the vagina. Pledgets of wool about the size of the top of the thumb, are boiled in a saucepan, and lysol added to make a solution of 0·5 per cent. The lysol acts as a lubricant. We carry a jar of prepared and sterile plugs, which we put into a scrubbed and scalded basin with 0·5 per cent. lysol. If you have no wool and the case is urgent, strips of linen or torn handkerchiefs will do. A full pudding-basin of pledgets will be needed, for the vagina is very capacious.

The woman lies in the left lateral position, with her hips projecting over the edge of the bed. Carefully cleanse your hands, the external genitals, the muco-cutaneous surfaces of the labia minora, and douche the vagina in the manner described under 'Abortion'. Pass a catheter. Insert the half of your left hand, leaving out the thumb, into the vagina, and using it as you would a posterior speculum, both pull back the perineum and open the orifice of the vagina with it. The finger tips of your left hand reach up to the posterior fornix and are able to hold the first plugs in position. Keep the basin with the pledgets of wool on a chair at your right hand. Take one pledget, squeeze it dry and push it with the fingers of your right hand well home into the posterior fornix. Take another, squeeze it and push it into one lateral fornix, a third into the other lateral fornix, and a fourth into the anterior fornix. If there is any space between these pledgets push more pellets in one by one until the cervix is firmly and securely ringed by pledgets. This ring round the

cervix is the foundation of the vaginal plug. If it is not firm the plug is useless. It is the foremost part of the ram, which will be explained when the action of the plug is considered. Then fill the vagina from above down with more squeezed pledgets, tucking an extra pledget in wherever space can be made for it. The stretched vagina is of far greater capacity than one would think, but eventually you will have filled it to the orifice of the urethra. Put a pad of
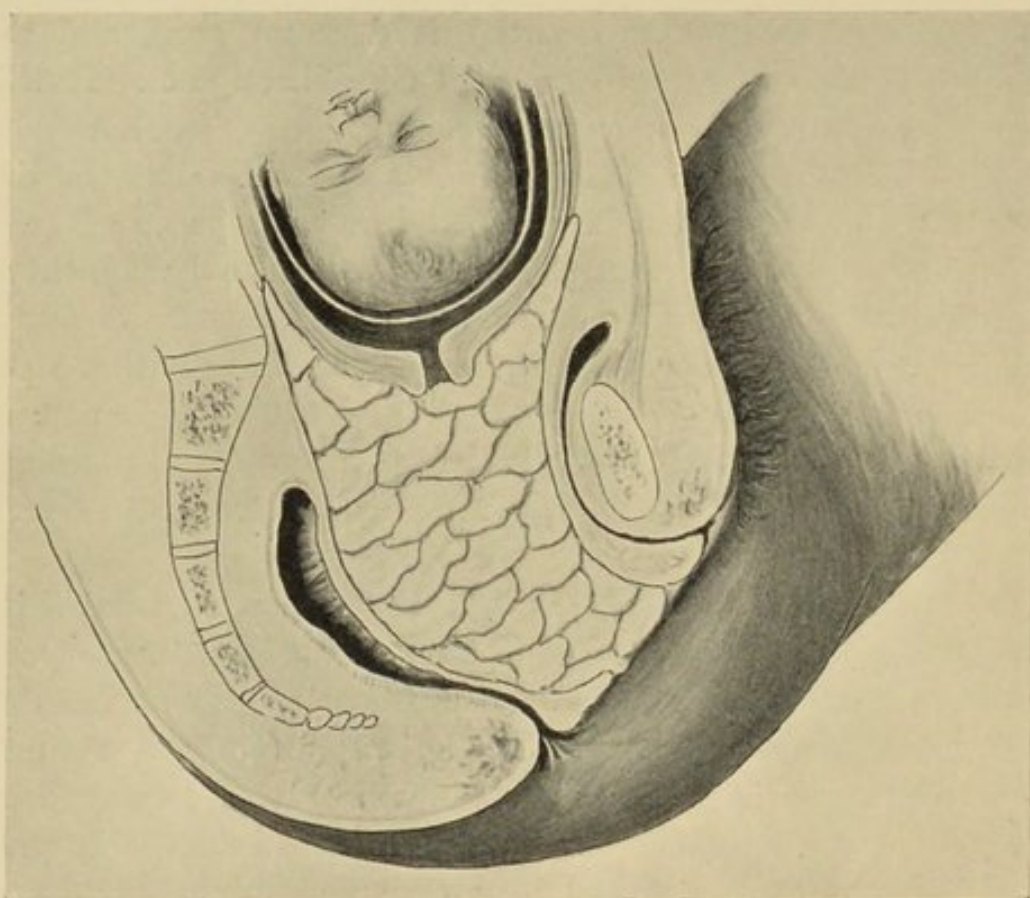
Fig. 60. The vagina plugged. Note the fornices pushed up by the plugs.

scorched gamgee tissue over the orifice of the vulva, and keep the plug in its place by a firm T bandage with the tail-piece passed between the patient's legs. Then put on a tight binder. Stand on the left side of the patient and pin the binder from above down, inserting the pins longitudinally with the points directed downwards.

How the vaginal plug stops the bleeding. We cannot give a definite answer to this question. Some have held that the bleeding is stopped by increased intra-uterine pressure, and

that blood cannot be poured out into a uterus squeezed between a tight binder and a vaginal plug. Others think that the pressure of the plug irritates the cervical ganglia and so excites contraction of the uterus. Our own view is stoutly denied by most authorities. We hold that the plug directly kinks and presses on the uterine artery. The uterine artery reaches the side of the uterus at the level of the internal os. Before its entry it sends down branches to the cervix. We believe that we first fix the cervix and then drive the cervical ring of pledgets like a ram into this angle against the uterine artery. Whether this explanation is right or wrong, we are sure that the efficiency of the plug depends on the efficiency with which we ram the cervical ring of pledgets up towards the uterine artery. You can actually feel the hard plugs from the abdomen reaching up well above Poupart's ligament.

Treatment of collapse. Having stopped the haemorrhage by the plug, if the patient is collapsed you must treat her for collapse. As we have said, the plug in the vagina causes shock, and this complicates the collapse and renders your treatment of the collapse less successful than you would wish. First put her on her back in bed and give her an injection of morphia gr. $\frac{1}{2}$ with atropine gr. $\frac{1}{8}$. This will save her from the pain the plug causes and the added shock due to the pain.

What is collapse? Collapse is the condition that follows loss of fluid from the body. Consequently the blood is less fluid than normal, is more viscous, and circulates with greater difficulty. Collapse is, in fact, viscid blood. The patient is pale, anxious, and perhaps restless. Her pulse is always rapid and feeble, with the exception that sickness after an anaesthetic may slow it temporarily. In shock, in which the blood is not less fluid than normal, the pulse may be quite slow. But in severe collapse the pulse is so rapid and feeble that it may be uncountable. The respiration is quick and shallow, with an occasional sigh.

The treatment of collapse. Naturally, as collapse is due to loss of fluid from the blood, the main treatment is to restore that fluid. But it is necessary to anticipate a description of infusion by an account of what happens after infusion.

Principles of infusion. Both the blood and the tissues are dry and thirsty. For the patient's sake it is more important that the blood should become fluid than that the tissues should get more fluid. But it has been found experimentally that when fluid is infused into a vein of an animal suffering from collapse, although at first the blood is rendered more fluid, the thirsty tissues quickly rob the blood of its added fluid, and not only that, but they take fluid from the blood with such avidity that the blood is eventually of higher specific gravity than before the infusion. A condition of secondary collapse ensues, which may be actually more dangerous than the initial collapse. It is most important to remember this when treating a case of collapse by infusion of saline.

Order of treatment.

1. The bleeding, the cause of the collapse, has been stopped by the vaginal plug.

2. If the patient is very bad, rally her temporarily by injecting hypodermically first a syringe full of ether, then one of brandy, and lastly, gr. $\frac{1}{20}$ of strychnine, in the hope that first the rapidly absorbable ether will restore her, that the more slowly absorbed brandy will take its place, and that finally the strychnine, with its more lasting effect, will take command.

3. If you have blocks, raise the lower end of the bed some two feet, so that the blood tends to run to the vital centres of the brain. Don't waste time looking for suitable blocks. A box or a chair answers very well.

4. Infuse two pints of normal saline (ζj to Oj) at about 99° F. either into the median cephalic or median basilic vein at the bend of the elbow, or a pint under each breast. The choice depends on the urgency of the case. If the case is urgent, inject into the vein; if it is not so urgent, inject under the breasts.

Venous infusion. If you have water that has been boiled, and Burroughs and Wellcome's tabloids of salt, so much the better. But if you have not, use ordinary tap water, warmed by the addition of water from the kettle, and ordinary table salt. You have not time to wait whilst boiled water cools.

You want a scalpel, probe, and infusion apparatus. There is no need for an anaesthetic, and the patient is too ill to mind pain. Bare one arm and tie a tight bandage round the middle of the arm. This makes the median basilic and median cephalic veins stand out just above the bend of the elbow. The median basilic is the larger vein, but the brachial artery lies directly under it, therefore the median cephalic is safer. We always choose the larger median basilic. Expose it by cutting along the skin over it for about an inch. Put the probe under it and move the probe up and down, so as to free the vein. Pass a piece of fine silk underneath it. Then fill your infusion apparatus with saline, holding the needle up to expel all air. Kink the tube to stop the flow. Cut through the anterior wall of the vein with the knife and insert the needle. You can tell if it is in the lumen of the vein and not between the coats of the vein wall by the ease with which the needle slips in. Tie the needle in with the silk thread. Then cut the bandage round the arm, and holding the funnel of the infusion apparatus about two feet above the patient's arm, let the fluid slowly run in, allowing about fifteen to twenty minutes for the two pints to enter the circulation.

Take out the needle or cannula, tie the vein above and below the nick in it with fine silk, cut these ligatures short and sew up the skin with salmon gut. Any temporary dressing, such as a clean handkerchief tied round the elbow, will do until you can get proper dressings.

Infusion into the breasts. Wash the skin at the lower edge of the breasts with soap and water. Fill the infusion apparatus with fluid. Pick up the breast with the hand and plunge the needle deeply into the tissues under the breast. If you have an infusion apparatus with double tubes and needles you can infuse under both breasts at the same time. Infuse one pint under each breast. The fluid takes longer to be absorbed than by venous infusion. Cover the puncture wounds with plaster. Massage the breasts gently to hasten the absorption of the fluid. The disadvantages of infusion of the breast are that the fluid does not go directly into the circulation and that if too much fluid is infused and the skin of the breasts made very tight, sloughing may ensue.

5. After infusion, inject a pint of strong coffee into the rectum, or, if it will not retain so much, give less.

6. Finally, if the patient's condition is desperate, resort to artificial respiration.

In addition, open the windows, keep the patient warm with
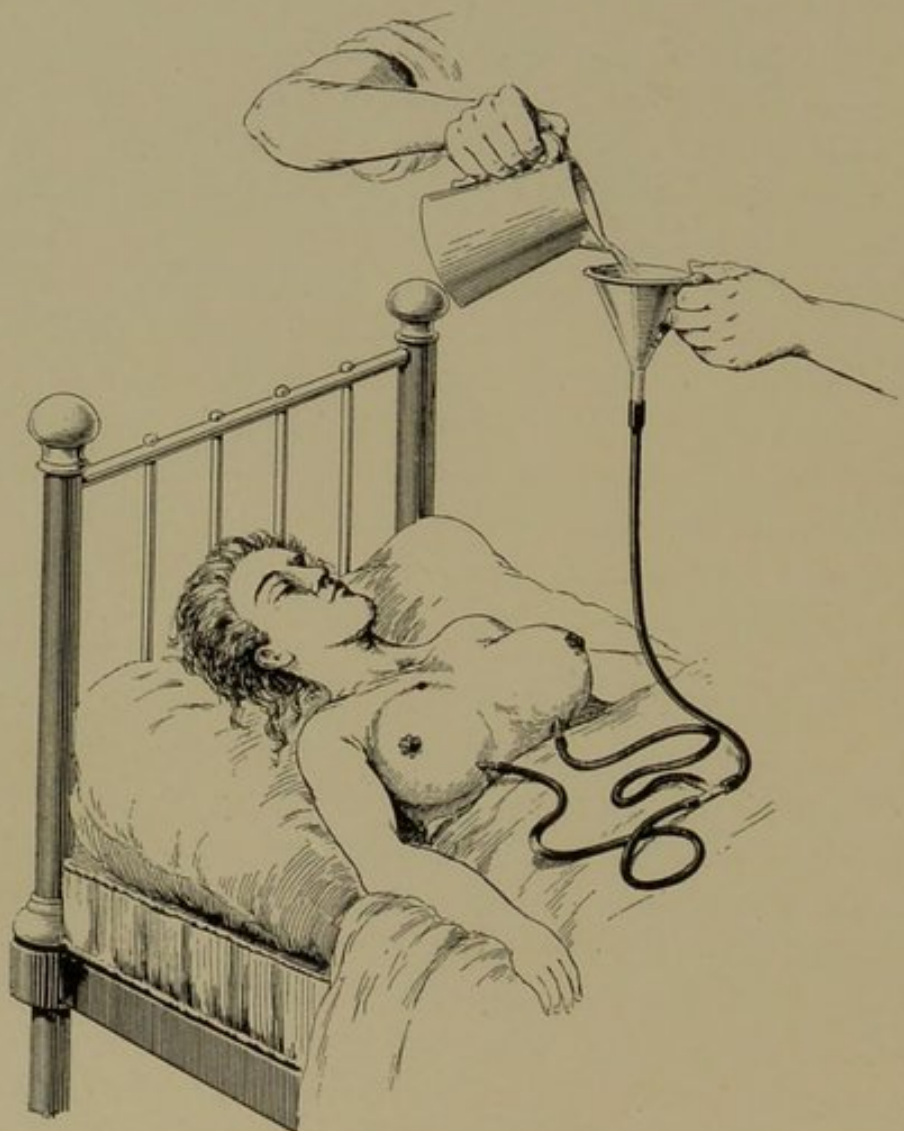
Fig. 61. Infusion of breasts.

hot bottles (wrapped in flannel) and with blankets, and do not attempt to give anything by the mouth, for she will be sick.

Watching for secondary collapse. The pulse always improves after venous infusion, but it may quickly flag again. When it begins to flag, it is a warning that secondary collapse is going to supervene. Therefore infuse two more pints either into the same vein above the top ligature or into the median basilic of the other side, or you may infuse into the breasts.

You may have to do this within half an hour of the first infusion. Give another injection of strychnine gr. $\frac{1}{20}$ and plenty of ether hypodermically. Then sit by the bedside of the patient and watch her carefully. You may have to treat a third occurrence of collapse, but you may prepare against this by injecting a pint of hot saline high up into the rectum half an hour after your second infusion. It is better not to leave your patient until labour has finished and fear of post-partum haemorrhage passed, if she has had dangerous collapse.

When to take out the plug. We advise you to remove the plug within six hours, and we consider six hours too long, if the plug produces much shock. When you remove the plug, you may find the os the same size as when you plugged. But when the cervical ring of pledgets is taken away, the os widens to full dilatation. The contractions of the uterus that have led to this dilatation are painless, possibly because the plug presses on and paralyses the cervical nerve ganglia. The fact of this full dilatation points to considerable uterine stress, and shows that the plug has been in as long as is compatible with safety.

If the os is not sufficiently dilated for the delivery of the child, watch by the bedside of the patient. If more bleeding occurs, replug.

Labour is often very rapid, easy and painless. The os is paralysed by pressure and the vagina has been enormously distended by the plug. If the child is not delivered quickly, deliver by forceps or bringing down the legs, as the case may be.

Be prepared for post-partum haemorrhage. The patient is enfeebled by the loss of blood and post-partum haemorrhage is very likely to occur. A little post-partum bleeding may lead to dangerous results, when following ante-partum bleeding. Therefore do not wait long for the placenta, if any bleeding occurs between the delivery of the child and that of the placenta. Express it or remove it by the hand and give a hot intra-uterine douche. Lastly, remember that the vaginal plug macerates the vaginal epithelium and bleeding makes the patient weak. Hence the patient is rendered more liable to puerperal sepsis.

PLACENTA PRAEVIA

Bleeding that is caused by the separation of a placenta, situated either wholly or in part in the lower uterine segment and comes on in the last four lunar months of pregnancy, is known as unavoidable haemorrhage, and the placenta is termed a placenta praevia. A placenta praevia is very often large and thin—placenta membranacea. Sometimes part of it covers the internal os, in which case it is known as a central placenta praevia; or the edge may be felt by passing the fingers during a vaginal examination through the internal os, placenta praevia lateralis. If the placenta is not felt by vaginal examination, it is clinically a case of accidental haemorrhage.

Frequency. We have had thirteen cases in hospital, and thirty-three in the extern department of the hospital in the last three years with four deaths from haemorrhage and one from sepsis.

Theories of placenta praevia. There are two feasible theories given for the abnormal implantation of the placenta. One is that owing to the decidua being diseased, the placenta has to spread over a larger area than normal to get sufficient nourishment. Part of this large placenta membranacea is implanted on the lower uterine segment. Another theory is that the placenta, either wholly or in part, is formed from the chorionic villi attached to the decidua reflexa, instead of from those attached to the decidua serotina. There are specimens which support this last theory. Neither theory has at present any practical bearing.

Why does a placenta praevia become partly detached in the last four lunar months of pregnancy? Two reasons are given. One is that the placenta being attached to decidua, which does not normally join with the placenta, the attachment is not firm but is easily separated. The second reason is that the lower uterine segment expands in the later months of pregnancy, in preparation for labour, and the placenta does not expand with it, and therefore becomes detached. Neither of these reasons seems very convincing, but the fact remains

that a placenta praevia does become detached before full term with considerable haemorrhage.

Danger of placenta praevia. Out of thirteen cases of placenta praevia in the hospital in the last three years, there have been two deaths. Of the thirteen babies nine were born dead. The same risk of sepsis that follows accidental haemorrhage, namely, decreased resistance from loss of blood and infection from manipulations, adds to the danger. The low situation of the placenta is also said to increase the danger of sepsis, offering a lower area than normal of blood clot (in the mouths of maternal sinuses) upon which microbes can feed. Another danger to which a woman with placenta praevia is exposed, is that due to a tear of the cervix extending to the uterine artery.

Signs and symptoms. The first sign of placenta praevia is external haemorrhage. The bleeding may occur during sleep. There is no pain, for the contractions of the uterus during pregnancy are not painful; hence the patient may not even wake up. The bleeding may be slight or it may kill the patient, before you can get to the house. Of one thing be sure, that if slight bleeding occurs, and this bleeding is due to placenta praevia, the bleeding will recur, and probably in so severe a form that it may kill the patient.

As the placenta occupies the lower uterine segment, the head of the child will not be fixed, but will be freely movable. For the same reason malpresentations are common.

Diagnosis. You diagnose placenta praevia by making a vaginal examination and feeling the placenta either through or lying over the internal os. By abdominal palpation the freely ballotting head or malpresentation with haemorrhage should make you suspicious, but your diagnosis is made by a vaginal examination. Therefore cleanse the external genitals and your hand carefully, and insert two fingers or your half hand, if you can, into the vagina. You will always be able to push one finger through the internal os. If the placenta is central you feel a spongy, thick substance between your finger and the presenting part, and if you separate this spongy mass a little, there is bleeding. If the placenta is lateral you feel its edge. You distinguish it from blood clot,

because you cannot break it up by pressure with your finger. Other signs given are filling in of one lateral fornix, increased pulsation or a boggy feeling in the fornices, but we do not rely on these. If the placenta is felt we diagnose it as placenta praevia. If it is not felt, we treat the case as one of revealed accidental haemorrhage. If, when the os has opened after vaginal plugging for accidental haemorrhage, but is not sufficiently open to allow of immediate delivery, and we feel the placental edge in advance of the presenting part, we treat as in placenta praevia, namely, by turning.

Treatment of placenta praevia. If the os is not sufficiently open to permit of two fingers being passed through the internal os, we plug the vagina and put on a tight binder as in revealed accidental haemorrhage.

If the internal os admits two fingers, we do a bipolar version.

If it admits the hand, we do an internal version.

If the os is fully dilated, we deliver the child rapidly and remove the placenta by the hand.

How to do bipolar version. Bipolar version was first described by Braxton Hicks. To do it the internal os must be large enough to admit two fingers, and where there has been a smart haemorrhage due to placenta praevia, you will usually find the os large enough to admit two fingers. It is possible to do bipolar version when the os admits only one finger, but it is not easy.

Put the patient in the cross-bed position. Give an anaesthetic. It is not always necessary, but you will find the operation much easier, for if conscious your patient will resist and make her belly hard. Make an abdominal palpation to ascertain the lie of the child. Sometimes the bleeding is so severe that you have not time to give an anaesthetic or to palpate. Wash the external genitals, pass a catheter, douche the vagina, and wear gloves. Pass your whole hand into the vagina. Rupture the membranes. Your object is to get one foot over the internal os. If the child presents by the breech this is easy. If the child lies transversely it is as a rule easy to pass two fingers up to the foot.

If the head presents, find out to which side the back is

lying. You want to make the child's lie a true transverse
with the limbs downwards. You have your whole hand in
the vagina, two fingers through the internal os, pushed
through the placenta praevia if the placenta is central, and
you have ruptured the membranes with a stylet. If you
picture to your mind a child presenting with its head down,
you will see that, if you push the child's head towards its
back and so turn the child, the limbs will be directed down-
wards, whereas if you push the child's head in the direction
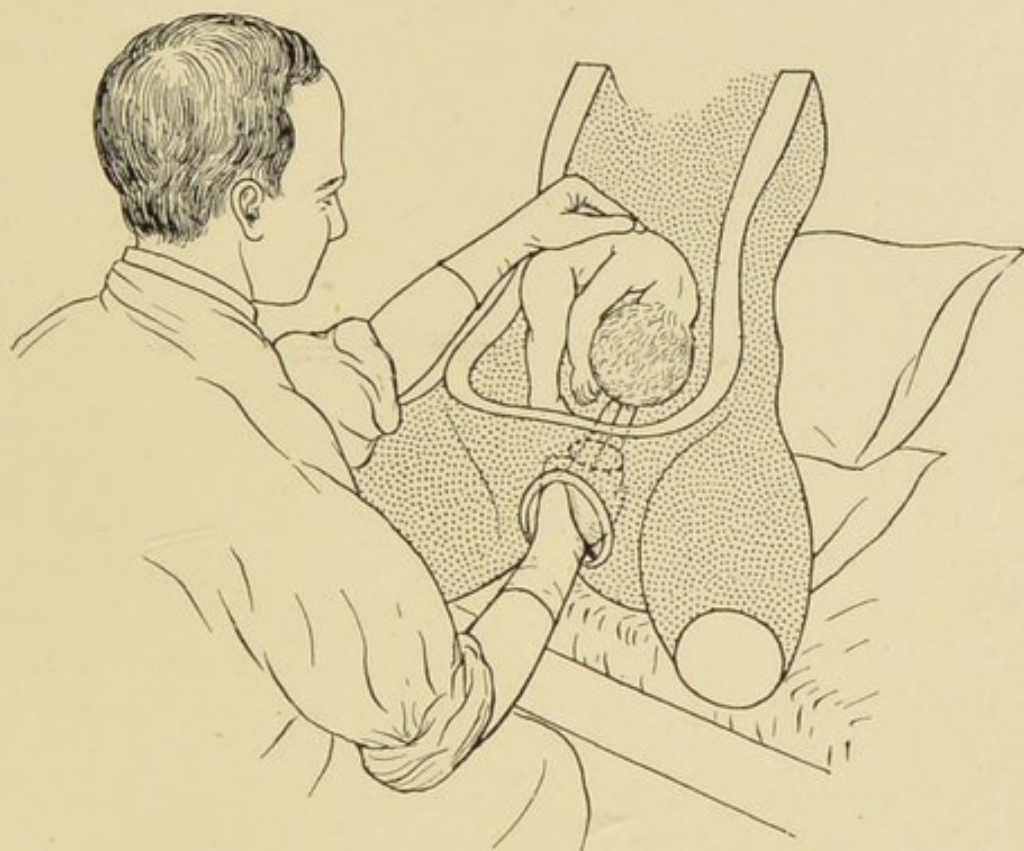
Fig. 62. Bipolar version.

of its abdomen, you turn the child, but the limbs are directed
upwards away from the internal os. Therefore it is essential
before doing bipolar version to be sure, to which side the
back of the child is directed. Then, whether the head is
central, in the left iliac fossa or the right iliac fossa, push
it with your two fingers in the direction of the back. Say
the head lies in the left iliac fossa, but the back is
directed to the mother's right side. With your two fingers
in the uterus you direct the head with a series of pushes

or rather pulls, until it lies over the os internum. At the same time with a hand on the fundus, you press the child's breech over to the mother's left side. Then with a series of pushes you direct the child's head up into the right iliac fossa and with the abdominal hand press the child's breech to the left and downwards. You have now got the child lying transversely, with its head in the mother's right loin, the breech in her left loin, and the face, limbs, and abdomen looking downwards. Still keep pressure on the breech pressing it down and towards the internal os, now feel about with your fingers for a knee and trace down to the foot. Either foot will do.

You must know how to distinguish the foetal parts.

To tell the knee from the elbow. The distinctive point is the tubercle of the tibia, which is not hard to feel. It is useful practice for these distinctions to carefully finger these points in the new-born child, that you may get familiar with their outline.

To tell the shoulder. You feel the acromion process, the ribs, and the spine of the scapula.

To tell a foot from the hand. The straight row of the toes of the foot as opposed to the separate thumb of the hand is not difficult to make out. Again, you can feel the heel and the ankle, which are quite distinctive. Also you can fold a thumb across the palm of the hand, and you cannot fold a great toe across the sole of the foot.

Pulling the foot through the cervix.

When you have caught a foot between your two fingers hold it there. You cannot easily pull the foot down through the internal os with the two fingers. The foot is too slippery. To force a third finger through the os, so as to catch the foot more firmly, is to endanger the life of your patient. The lower uterine segment is made sodden by the insertion of the placenta and will tear like wet blotting-paper. The tear runs up into the body of the uterus across the uterine artery and leads to terrible haemorrhage. This is a very real danger, and we warn you never to attempt to force the internal os open in placenta praevia.

How then are you to pull the foot through? Take a bullet

forceps in your left hand, and guiding it with the fingers to the foot, catch the foot with it and pull the foot through the cervical canal. Even if the child is alive—and it is very likely dead—a bullet forceps on its foot never does any harm. Sometimes you can guide the foot over the internal os with the two fingers and then press it through the cervical canal by abdominal pressure on the breech, and you can try this before you take the bullet forceps. If you pull down a hand
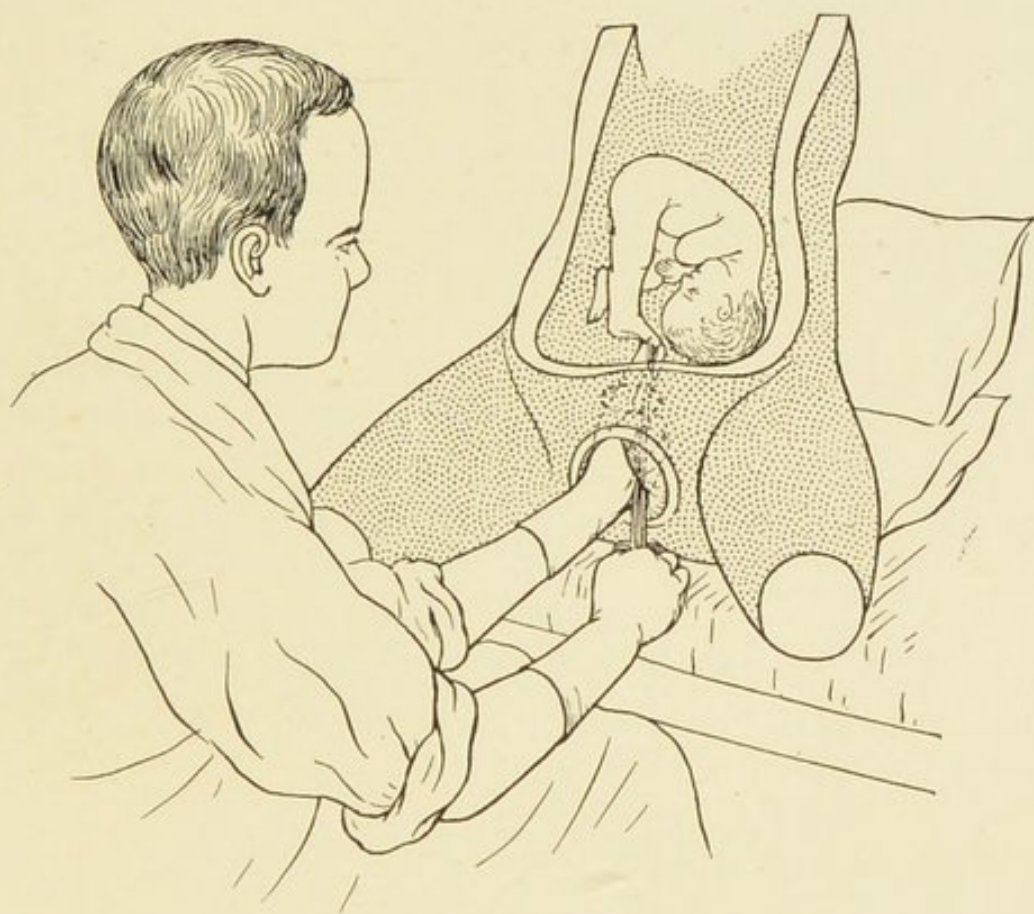
FIG. 63. Catching the foot with bullet forceps.

by mistake, tie a long piece of iodoform gauze round the wrist and push the hand back. By pulling on the gauze, when the child is being born you will prevent its extension. When the foot is in the vagina tie a piece of gauze round the ankle and let the end of the piece of gauze hang out of the vulva.

All danger of further haemorrhage is now past. The half breech presses on the placenta and compresses the bleeding points. If there is any bleeding, pulling on the piece of

gauze will at once stop it. If the patient is not collapsed you can leave her in the hands of the nurse, telling her to pull on the gauze, if there is any bleeding. Labour may set in strongly for two days. The child is probably dead, but the immediate danger to the mother is past.

Be at hand, when labour sets in and the leg is pushed down by the pains, for post-partum haemorrhage is likely to occur.

Internal version. For internal version the whole hand must be passed into the uterus. The preparations are the same as for bipolar version. With the hand in the uterus you feel for and catch a foot and pull it down. You may have to push the head away towards the back—in fact, carry out the first steps of bipolar version—before you

Fig. 64. The foetus turned in placenta praevia.

feel the foot. The child turns quite easily of itself, when
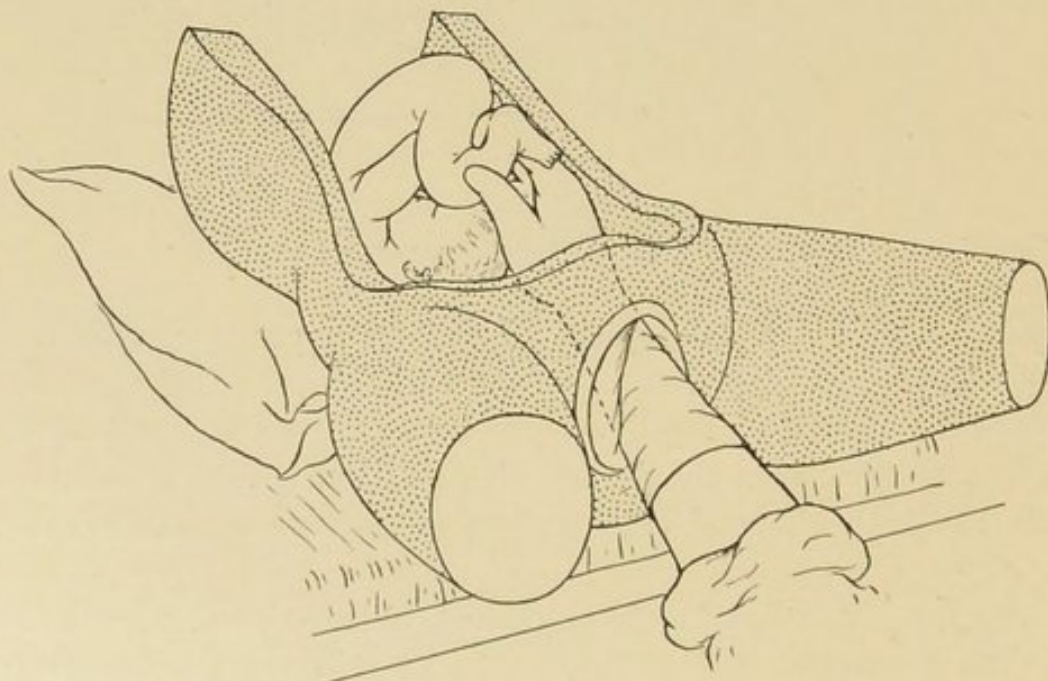
Fig. 65. Internal version. Catching the foot.

you pull down the foot. Again you tie a strip of gauze round
the ankle and leave one end hanging out of the vulva.

Sometimes, when you pull the leg the child will not rotate.
Whilst you pull on the leg, get the nurse to pull the head
up to the fundus with her hands on the abdomen, or tie iodo-
form gauze to the foot and pull on that, while with your
other hand in the vagina or uterus you push the head up
towards the fundus.

Labour is probably in progress, if the os is big enough to
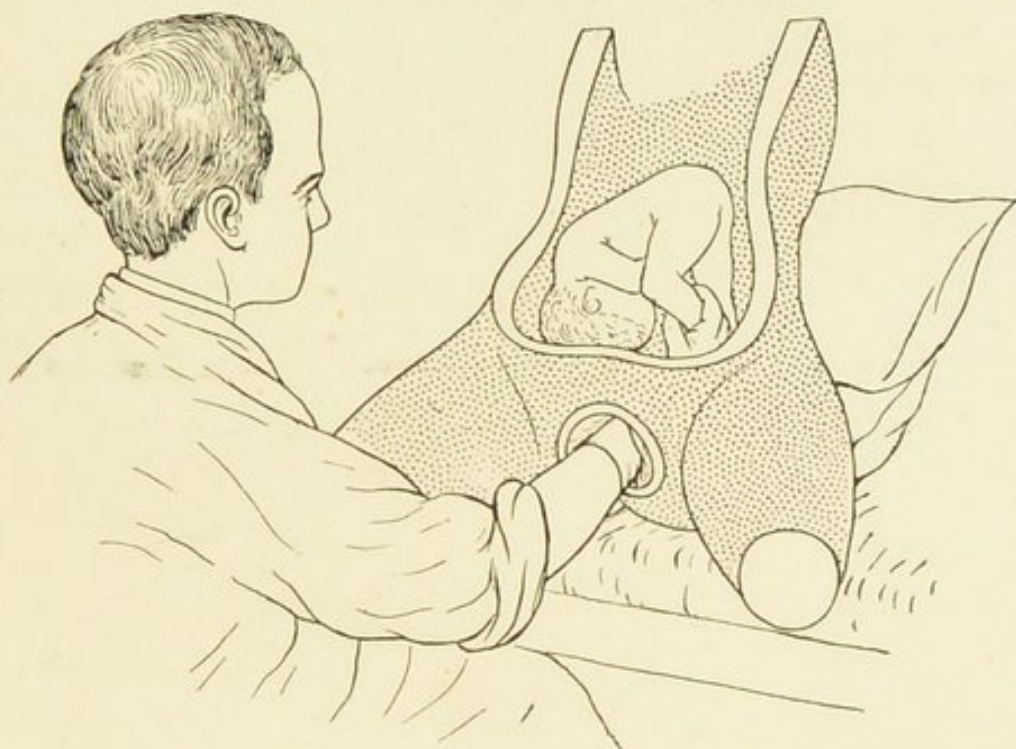
FIG. 66. Internal version. Bringing down the foot.

admit the hand. It is better in this case to wait for an hour
to see how labour progresses, and then decide whether to stay
or to leave. In nearly all cases it is better to stay.

Once more, remember the risk of post-partum haemorrhage.
The placental site, being in the lower uterine segment, contracts
and retracts badly. As the low implantation of the placenta,
the anaemia, and the manipulations, all predispose to sepsis,
we give a hot intra-uterine douche after the delivery of the
placenta.

Champetier de Ribes' bag. Treatment of placenta praevia
by turning has not met with universal acceptance, the chief

objections to it being that the infant mortality is so great. The rival to this treatment is the use of Champetier de Ribes' bag. This is a pear-shaped bag, which can be boiled and passed through an os which will admit one finger by a special pair of forceps. It is then filled with water by a syringe. When the bag is in position, the control of haemorrhage is complete. It presses on the placenta in the same way as the half breech. Some people tie a weight of two pounds to the tube of the bag and hang the weight over a pulley to keep up pressure. The advantages of the bag are said to be that no more mothers and fewer children die than when treated by version. But we do not know of a large collection of cases that prove this. The disadvantages are that in general practice placenta praevia is rare, and when you want to use the bag you may find that it leaks or is too sticky for insertion. We do not use the bag at the Rotunda Hospital for placenta praevia. But we are not at all opposed to its use.

We now pass from the haemorrhages of pregnancy to the abnormalities produced by the toxaemia of pregnancy.

CHAPTER VII

ABNORMALITIES DUE TO THE TOXAEMIA OF PREGNANCY

Headache—Pernicious Vomiting—Albuminuria—Eclampsia —Hydraemia

THE existence of pregnancy renders a woman liable to toxaemia. The reasons why it does so have not been clearly defined, but increased metabolism together with inefficient elimination are the main factors. Increased metabolism is due to the addition of the foetus and its needs to the mother's organism. The foetus is until birth the parasite of its mother. Again, owing to the increased needs of her body she eats more, and is especially liable to eat more nitrogenous food. The liver is the organ that mainly presides over metabolism, and any defect of the liver increases the liability to toxaemia. Defective elimination is seen when there is constipation or the kidneys are diseased or inefficient. Diminished exercise would act in this way. One is not surprised then to find that a hereditary tendency to the toxaemia of pregnancy has been found by Mlle Stein, nor that when a woman has been subject to toxaemia during one pregnancy, she is more liable to it in a succeeding pregnancy.

Both in its minor and major evidences the toxaemia of pregnancy is comparable to other toxaemias. Headache, vertigo, lethargy, pruritus, loss of appetite, nausea, flashes of light, tremors, loss of memory, irritability, insomnia, or melancholy, are all common manifestations of toxaemia, and are all warning symptoms of the onset of severe toxaemia. They may precede such different forms of toxaemia as diabetic coma, uraemia, yellow fever, phosphorus poisoning, or eclampsia. In the major evidences of toxaemia, the toxaemia of pregnancy resembles other similar forms. Thus—convulsions, severe or

black vomit, delirium, and coma are common to many toxaemias besides that of pregnancy. Again, pathologically, the toxaemia of pregnancy resembles other toxaemias. Thus the liver is always affected. Acute hepatitis with necrosis, cloudy swelling, or granular degeneration are found. The kidney is found to be acutely congested or inflamed in many cases and closely resembles the kidney of scarlatina. Spleen, brain, blood and other organs are affected in varying degree as in other toxaemias.

The diminished alkalinity of the blood, characteristic of the blood of diabetic coma and other acid intoxications, is also found in severe cases of the toxaemia of pregnancy; and the nitrogen excreted from the body shows increased ammonia and decreased urea coefficients, another characteristic of the group of toxaemias, termed by some pathologists 'acid intoxications'. The commonest acid intoxications are due to fever, diabetes, acute yellow atrophy of the liver, severe anaemia, such as pernicious anaemia and severe gastro-intestinal disease. It is interesting to note that both acute yellow atrophy of the liver and pernicious anaemia have been found by physicians to be more common in pregnant than normal women.

Finally, by decreasing the metabolism of the pregnant woman, by diminishing her solid and especially her nitrogenous food and by increasing her eliminative power by giving her purges and large drinks of water, you can ward off severe toxaemia, unless already too advanced, and you can cure the minor forms.

There seems then to be no doubt that a pregnant woman is especially liable to suffer from toxaemia. The next question is, what is the toxin? To this no answer can be given. The possibility of a special placental toxin will be discussed under Eclampsia.

What are the diseases of pregnancy which are due to toxaemia? Some diseases of pregnancy are undoubtedly due to toxaemia. Such are severe headache, pernicious vomiting, acute nephritis, and eclampsia. Hydraemia, though not proved to be due to toxaemia, will be included in this book under the head of diseases of pregnancy due to toxaemia. All of these diseases have this in common, that a careful attention to the

hygiene of pregnancy, to diet, to sleep, to exercise, and to the action of the bowels and kidneys, will either prevent them or certainly decrease the liability of the patient to them. With increased research the field and nature of the toxaemia of pregnancy is becoming better understood.

SEVERE HEADACHE

Persistent severe headache, especially if accompanied by insomnia, is a sign of toxaemia, unless due to some definite brain disease.

Treat it by decreasing the amount of nitrogenous food, by purging, by the daily bath, by exercise, and by getting your patient to drink at least two pints of water a day.

HYPEREMESIS OR PERNICIOUS VOMITING

Definition. The ordinary morning sickness of pregnancy begins as a rule about the sixth week of pregnancy and ends commonly about the end of the fourth lunar month. However objectionable it may be to the patient, its important feature is that it does not injure her health. Vomiting may be more severe than this. It may occur at other times of the day. It may injure the patient's health. It may become unconquerable and kill the patient. All vomiting that injures the patient's health, whether slightly or severely, is to be treated as pernicious vomiting.

Other causes of vomiting during pregnancy. Your patient may have gastric ulcer or cancer of the stomach. She may have chronic dyspepsia, cirrhosis of the liver, or a tumour of the brain. She may be a chronic alcoholic. All these diseases cause vomiting. When pregnancy adds its tendency to produce vomiting to one of these diseases, pernicious vomiting may result. Therefore examine your patient carefully for any of these diseases.

Conditions sometimes associated with hyperemesis. Hysteria is sometimes associated with hyperemesis. Backward displacement of the uterus and erosion of the cervix are sometimes associated with hyperemesis. Therefore always

examine your patient for retroflexion of the uterus or erosion
of the cervix. Replace the uterus and put in a Hodge's
pessary. Treat the erosion by local applications. By curing
these trifling complaints, you sometimes cure the hyperemesis.
But you do not always do so.

Signs and symptoms. Vomiting is the principal sign. At
first it may not be more than the vomiting so often seen in
the early months of pregnancy. But it is difficult to control,
or begins to occur at other hours of the day than the hour of
rising. Other signs of toxaemia accompany it, such as head-
ache, constipation, insomnia, pruritus, irritability, or morose-
ness. The patient begins to lose flesh and strength. Then
the vomiting becomes more persistent, causing great pain and
occurring every time anything is introduced into the stomach,
and finally bile-stained or black vomit is thrown up from the
stomach. The severer signs of toxaemia appear. The tempera-
ture rises, the pulse is feeble and rapid. Your patient has
intense thirst, her tongue becomes dry and brown, her teeth
covered with sordes, her breath foetid and she may have
diarrhoea. Her urine is scanty, dark coloured, and contains
albumen, acetone, diacetic acid, and perhaps blood. She
becomes delirious and eventually dies in coma.

Sometimes abortion occurs. Abortion may kill an ex-
hausted patient by the shock of labour or by puerperal
sepsis. But if it does not kill her, her condition will probably
greatly improve. The significance of these facts on treatment
is clear.

Treatment. First exclude general diseases, hysteria, and
the influence of a backward displacement of the uterus or
eroded cervix. Put your patient to bed to decrease the
metabolism of exercise.

Your efforts are next directed to elimination of toxins by
the natural channels and to give nourishment in a digestible
form. Give your patient a purge, so that her bowels are
open at least three times in the twenty-four hours. The
ordinary Mist. Alba repeated two-hourly may be tried, together
with two blue pills. A drachm of Pulv. Jalapae Co. is a good
purge and may be repeated in six hours, or you may give five
to ten grains of calomel in a small keratin capsule. The keratin

is unaffected by the gastric juice, but is dissolved by the juices of the duodenum. If your patient vomits your purge, you must open the bowels by enemas. Large soap and water enemas with two ounces of castor oil are suitable. If she retains water in her stomach so much the better. Give her as much hot water as you can persuade her to take. If she is sick give her two pints of saline through a soft catheter into the rectum, passing it as high up as you can.

Your next attention is to the vomiting and the giving of food. You can do nothing better in severe vomiting than wash out the stomach by a soft siphon tube with warm water, and a little sodium bicarbonate. The sodium bicarbonate loosens the viscid mucus that is secreted and clings to the walls of the stomach. Stop all food for twenty-four hours, except albumen water (the whites of two unboiled eggs to a pint of cold water with a little lemon juice) and plain water. Then try her cautiously with pepsencia whey or peptonized milk.[1] Treat her stomach with the drugs commonly given for vomiting, such as Tr. Iodi. $\mathfrak{m}$j every two hours, or a mixture containing bismuth and dilute hydrocyanic acid. Put a mustard plaster over her stomach. If vomiting persists, rest the stomach entirely for three or four days and feed her by nutrient rectal enemata, washing out the rectum with salt and water once or twice a day, before giving an enema. As an enema you can give the white of two eggs, one ounce of starch, fifteen grains of common salt, and eight ounces of peptonized milk, every six or eight hours.

If all these efforts fail to produce any good effect on your patient, you have one measure that may relieve her, namely, the emptying of the uterus. You will relieve her, provided you do not leave the operation until she is so weak that she will be killed by it. Therefore, if you decide to induce abortion, decide before it is too late.

How to empty the uterus. The methods have been described under abortion. The method of choice is to dilate with sea-tangle tents for five or six hours, by which time you

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[1] **How to make pepsencia whey.** Take a pint of fresh milk, warm it to 100° F. Add a tablespoonful of pepsencia. Leave for five minutes. Then break the curd up with a fork and strain the whey through muslin.

should be able to get a finger into the uterus. If the os is not large enough to permit of this, continue dilatation with Frommer's or Hegar's dilators until you can get two fingers into the uterus. It is best to try to complete the emptying of the uterus within eight hours, for delay is bad for the patient.

ALBUMINURIA

A woman with chronic nephritis may become pregnant. We are now dealing with albuminuria that arises solely as a result of pregnancy.

Albuminuria seldom occurs before the seventh lunar month of pregnancy. Albumen may be present either in small or large quantities. Its importance is that it is evidence of a toxaemic condition that may produce swelling of the legs, puffiness under the eyes, and swollen labia, that it is very likely to lead to intra-uterine death of the foetus or premature labour, and, lastly, it may precede eclampsia. Like all other toxic diseases of pregnancy, it is more common in primiparae than in multiparae.

Treatment. In order to detect the presence of albumen in the urine, it is well to test the urine once a fortnight during the last four lunar months of pregnancy. If the case is slight, get your patient to have her bowels opened twice a day until the child is born. Let her have a daily warm bath and drink two or more pints of water daily. Regulate her diet. Tell her to avoid meat and alcohol and to take mainly milk, with milky puddings, bread and butter, and light farinaceous food. If the albumen decreases she may have fish and eggs, but she should keep on this light diet until ten days after the child is born, provided the albumen has then disappeared from a catheter specimen of her urine. In a more severe case, with diminished urine, much albumen and oedema of the legs, you should keep your patient in bed, keep her bowels open, give her water, let her have a warm sponging night and morning, and let her take milk only, until she has become a mild case of albuminuria.

Once albumen has appeared in the urine, it may diminish with treatment, but it rarely disappears, until the baby is born.

ECLAMPSIA

What is eclampsia? Eclampsia may be defined as the occurrence of fits in a pregnant woman, which would not have seized her had she not been pregnant. Hysterical fits and fits due to cerebral lesions are readily distinguished from eclampsia. Epilepsy is not so easily differentiated, and therefore in describing the fits, we shall contrast them with epileptic fits. Uraemic fits, occurring in a pregnant woman, are indistinguishable from and classed as eclampsia.

When, during pregnancy, does eclampsia occur? It rarely occurs before the sixth lunar month of pregnancy. Its incidence becomes more frequent the nearer the time is to full term. It may show itself for the first time five days after the delivery. The commonest period of its incidence is the last two or three months of pregnancy.

Danger of eclampsia. Eclampsia is always a serious disease, and is most serious when it occurs during pregnancy at full term. Statistics show an average maternal mortality of between 20 and 30 per cent. Nearly all the children die either before or soon after birth. Eclampsia starting after the birth of the child is generally considered to be less serious than when starting before the birth of the child, but in our experience we have not found this to be the case.

Notable facts connected with eclampsia.

1. Like other diseases due to toxaemia, it is more common in primiparae.

2. It more often occurs with twin pregnancy.

3. It is apt to occur in this country when the weather becomes cold and damp.

4. The birth of the child or its death in utero, as a rule but not invariably, greatly improves the condition of the mother.

5. Albuminuria is almost always a precursor of and is always found subsequent to a fit.

6. The greater the number of fits, the greater the danger to both mother and child.

7. Death of the mother may follow a few fits and recovery may take place after more than thirty fits.

8. The kidney disease that is present in eclampsia subsides, and does not, as a rule, recur in subsequent pregnancies.

Warning signs and symptoms of eclampsia. The warning symptoms are the less serious symptoms of toxaemia, such as headache, vertigo, flashes of light before the eyes, pruritus, drowsiness, irritability, insomnia, constipation, oedema of legs, puffiness under the eyes and albuminuria.

Significance of warning signs and symptoms.   If a patient complains to you in the later months of pregnancy of any of the above signs and symptoms, make an examination of her urine for albumen and, if found, treat her as described under albuminuria. You may thus ward off eclampsia, a disease that has a mortality of between 20 and 30 per cent. The significance of warning signs and symptoms and their early recognition could scarcely be greater.

The eclamptic fit (contrasted with an epileptic fit). The eclamptic fit, like the epileptic, starts with an initial tonic convulsion. The patient, with or without an aura, such as twitching of the eyelids, rolling of the eyes, or a gasp for breath, becomes suddenly unconscious and stiff. If she is standing she falls heavily to the ground. She does not give the epileptic cry. All her muscles are stiff with tonic contraction. Her face is red and congested, her hands clenched, her jaw locked, sometimes biting the tongue, her chest is fixed, her arms flexed, and her back stiff but rarely arched. In all this the tonic stage resembles the tonic stage of an epileptic fit. The difference between the two lies in the duration of the tonic stage. In eclampsia this stage is so brief, that it may easily pass unnoticed, whereas in epilepsy it lasts a few seconds and its characteristics are so definite that the impress of the few seconds of spasm is very marked upon the minds of bystanders. This difference of duration, and the history of previous fits, are the features that distinguish eclampsia from epilepsy.

The clonic stage of the two sorts of convulsions are indistinguishable. The clonic stage lasts from one to two minutes. The muscles that were stiff twitch or jerk. The face twitches, the breath comes in fits and starts, the arms may be jerked violently, but the legs are rarely affected. The last stage of the fit is the stage of coma. The muscles relax

and the patient sinks into coma with heavy breathing. Consciousness, which is completely absent during the attack, is gradually restored and the pupil reflex, which is also absent, returns, unless another seizure supervenes.

Events following the fit. The patient may pass from the coma into a deep sleep, from which she awakes with a head-ache and mental confusion. She may have no more fits and recover; or, after a sane interval, she may again be convulsed and again recover. Sometimes she is maniacal for a varying time before complete recovery. On the other hand, she may never recover completely from a convulsion, but may again be convulsed before recovery and the fits may recur in rapid succession. With increasing number of fits, there is increasing peril to her life. This is evidenced by the deep and prolonged coma, by the rising temperature, and by the faster and feebler pulse. Coarse rales are heard throughout the chest and are due to oedema of the lungs, which is a common precursor of death in this disease, as in acute nephritis, and severe tox-aemias in general. Fits may be absent for many hours before death, but the coma remains profound, and the heart, over-whelmed by the poison, becomes weaker and weaker until it finally ceases to beat.

Frequently eclampsia leads to the onset of labour or the onset of labour induces eclampsia. Therefore, in nearly all cases, you must expect the birth of the child. The child is in nearly all cases dead, unless the eclampsia is very mild.

Principles of treatment. Treatment is based on the following propositions:—

1. Prolonged labour is bad for the mother and therefore, as soon as the os is sufficiently open, the child should be delivered artificially.

2. That eclampsia is an intoxication due to accumulated toxins produced by the increased metabolism of pregnancy or in some other unknown manner.

3. That the excretory organs by which the body deals with these metabolic processes and eliminates them are defective. The organs chiefly concerned are the liver, the kidneys (both of which show marked post-mortem lesions), the bowels, and the skin.

Hence the treatment is: I. Delivery when possible. II. To avoid further metabolism. III. To aid excretion. IV. Symptomatic.

I. **Delivery when possible.** We do not advocate accouchement forcé in any form. We wait until the os is sufficiently open and the head fixed enough to apply forceps, or until the os is sufficiently open to deliver as a breech.

II. **To avoid further metabolism.**

1. **Starvation.** Food leads to the metabolism of digestion. We give no food either by mouth or rectum. There is no fear of starving the patient. We have never seen the fits last continuously for three days, and you can starve your patient for three days without great harm to her, if necessary.

2. **Accouchement forcé.** This treatment is founded on the theory that the foetus or the placenta is the source of the eclamptic toxin. Liepmann, working under Bumm of Berlin, has recently isolated a body from eclamptic placentae at the onset of eclampsia, which he failed to find in the placentae of well-established eclamptic patients. This body when injected into animals produced convulsions and death. His experiments were very carefully conducted. He theorizes from his experiments (a) that the placenta manufactures the toxin, and he apparently presumes (b) that the placenta stops manufacturing the toxin when it passes into the system. But convulsive poisons have been isolated from the faeces. Again, Liepmann did not attempt to recover a convulsive poison from other organs, such as the liver, spleen, or kidneys; nor did he consider the question that the difficulty or impossibility of isolating the poison from the placenta in the later stages of eclampsia might be owing to its firmer combination with the living tissues; nor can he rationally account for the cases of eclampsia that first arise four days after the delivery of the placenta. Therefore, we accept his facts as facts, but we do not found our treatment on his theories.

The objections to accouchement forcé are that it leads to severe shock; if performed during the convulsive period it increases the irritation of the poisoned nerve centres; sepsis is liable to arise after it; nor have any statistics yet been published that show its superiority as a treatment over the

treatment adopted at the Rotunda Hospital and elsewhere. Until such statistics are forthcoming and convincing, we prefer to treat our cases by less drastic measures than accouchement forcé.

3. **Morphia.** Morphia decreases metabolism and hence temporarily and partially puts the metabolic sources out of action. It decreases the cerebral irritability and controls the fits. It does not depress the heart and probably has no effect on the secretion of the kidneys. We have great faith in morphia.

4. **Washing out the stomach.** The stomach is washed out to get rid of any food in it. In severe eclampsia, digestion is in abeyance. But in milder cases digestion can take place. Hence, washing out the stomach prevents the metabolism of digestion.

III. **Eliminative or excretory treatment.**

1. **Purging and washing out the bowel.** The bowel is an excretory organ, as well as the kidneys. Getting rid of contained faeces not only prevents further faecal intoxication, but helps the eliminative action of the bowel.

2. **Sweating.** The skin is a poor excretory organ. We are doubtful whether the weakness produced by sweating the patient is compensated by the feeble excretion produced. We do not sweat our patients.

3. **Urinary excretion.** Urinary excretion is very important. The amount and specific gravity of the urine excreted are counts of the amount of solids excreted. When the secretion of urine is free, the case will do well.

4. **Bleeding.** No one knows to what extent the toxin is in the blood. Again, bleeding is not a natural method of elimination. We do not bleed our patients.

5. **Infusion.** The infusion of fluids into the breasts in normal animals leads to increased diuresis. Some think it does good by diluting the poison. We used to use normal saline for infusion. But it has been shown that salt, when the kidneys are diseased, is not excreted and leads to the locking up of fluid in the solid tissues. In other words it increases oedema. We are not sure as to the advantage or not of infusion. In profound toxaemias, we should be inclined

to infuse one pint, twice a day under the breast, of a solution of sodium bicarbonate ℥ ij–℥ iv to the pint. The injection of this sodium bicarbonate has been found to arouse patients from diabetic coma. However, our experience of sodium bicarbonate in the profound toxaemia of pregnancy does not justify more than the suggestion that it may be better to substitute sodium bicarbonate for sodium chloride.

IV. **Treatment of special signs.**

1. **The convulsions.** Chloroform and chloral control the fits and so limit the muscular metabolism and cerebral exhaustion due to the fits. But chloroform acts like the eclamptic poison itself in depressing the heart. For this reason we use morphia and do not use chloroform, chloral, or bromides.

2. **Heart weakness.** To support the heart we rely mainly on digitalin and alcohol given hypodermically. We rarely use strychnine, for strychnine itself tends to produce convulsions.

3. **Respiration.** The respiration is depressed by morphia. Atropine counteracts this depression produced by morphia. We therefore give atropine gr. $\frac{1}{100}$ with each half-grain of morphia.

How to carry out the treatment. Having discussed the general principles of treatment, we proceed to describe the routine treatment as carried out at the Rotunda Hospital. In describing this treatment, it is to be understood that, if at any time owing to the dilatation of the os, &c., delivery becomes possible by forceps, or breech delivery, it is to be undertaken at once.

When a patient is brought into hospital and eclampsia is diagnosed, she is put to bed, and a half a grain of morphia sulphate with one-hundredth of a grain of atropine is injected subcutaneously by a boiled hypodermic syringe. If further fits occur, another quarter of a grain with atropine gr. $\frac{1}{200}$ is given in two hours' time. This dose is repeated every two hours, if necessary, up to two grains in the twenty-four hours. We have seen the respirations fall to six a minute in some cases from the morphia, but provided it is then stopped, the warning comes in time, and we have never seen any harm result from it.

If she is conscious, and she can swallow when she comes in, she is given either one and a half drachms of compound jalap powder, or two ounces of castor oil, or three ounces of black draught. She is also made to drink large draughts of water.

If she is unconscious or intractable, we wait for a quarter of an hour, to allow her to come well under the influence of the morphia, and then pass a soft siphon stomach tube. *To pass a stomach tube*, grease the tube with glycerine, fill it with water, and get some one to pinch the tube near the funnel. Put a gag into the patient's mouth. Put two fingers well to the back of her tongue, and push the stomach tube quickly down the oesophagus.

We then wash out the stomach with successive pints of warm water, pouring in a pint through the funnel, and then lowering the funnel over a bath on the floor to allow the fluid to run away by siphon action. About four pints usually suffice to wash out the stomach, but we continue until the return is clear. Half a pint of water is left in the stomach. Before withdrawing the tube, we pour in two ounces of castor oil with three drops of croton oil. Castor oil is sticky, and does not pass readily down the tube. To make it run in, pour a little hot water on the top of it, and when it has entered the tube, squeeze the tube between your finger and thumb from the funnel downwards as you withdraw it.

We then turn the patient on to her side. A long, soft rubber tube, lubricated with glycerine and filled with water, is then pushed through the anus, and as high up the rectum as possible. We try to get eighteen inches of the tube into the bowel, for the higher the tube passes, the more bowel is cleansed. Allowing the water to run whilst the tube is being pushed in makes its progress easier, for the flow of water separates the apposed surfaces of the bowel. We then wash out the bowel, until the return is clear, with warm water in precisely the same way as the stomach is washed out. We leave about one pint of water in the bowel.

We next pay attention to relieving the congestion of the kidneys. Hot poultices of linseed meal are applied every

two hours to the loins. The poultices must not be too hot. A temperature which does not injure the skin of a healthy woman may injure the skin of an eclamptic.

If the patient is profoundly unconscious, we next infuse one pint of saline under one breast. As we have said, we think, perhaps, sodium bicarbonate is better than sodium chloride for this purpose. If she is still profoundly unconscious at the end of eight to ten hours, we infuse a pint under the other breast.

We then pass a catheter, and withdraw her urine and measure it. The patient is then covered with blankets.

She is always kept on her side until she is properly conscious. She is put on one side for four hours, and then changed to the other side. This is of great importance in comatose and semi-comatose patients, for the saliva trickles into the cheek and out of the mouth. If she lies on her back, it trickles over the back of the tongue and down the insensitive larynx, and adds to the oedema of the lungs.

No food is given to the patient until she has obviously recovered from the fits. Then milk and hot water is given. No medicine is given by the mouth unless she is quite conscious, for swallowing is either absent or defective, and the medicine is as likely to go into the lungs as the stomach. For similar reasons we do not put a gag in the mouth, except during a fit, to prevent the tongue being bitten, or whilst the stomach tube is passed, for a gag altogether abolishes the power of swallowing. It is impossible to swallow with the teeth separated.

If the heart shows signs of failing, we inject ten to twenty minims of brandy or whisky under the cleaned skin, and digitalin gr. $\frac{1}{100}$, with a sterile syringe. But when the heart begins to fail, the case is very serious, and in spite of all the heart drugs, nothing seems to stimulate the poisoned heart.

We have now done all that is immediately necessary to the patient. With the exception of changing her position from time to time, and renewing the poultices to her loins, she is left in a darkened and noiseless room, and is not disturbed. A nurse sits by her to put the gag in her mouth should she have a fit, to keep an hourly reckoning of her pulse,

and to report her condition, should she need more morphia or heart tonics. She is left in this way for eight to ten hours.[1] If at the end of eight or ten hours she shows no improvement, she is again infused with a pint of fluid under her breast. If her bowels have not opened spontaneously as the result of the purge, the bowel is again washed out, or a large soap and water or castor oil enema given (Ol. Ricini ℥ij, Ol. Olivi ℥iv). A catheter is again passed, and the urine measured and examined.

If at the end of another six hours the bowels have not acted spontaneously, and the patient is still too drowsy to swallow, another purge must be given by either the stomach or the nasal tube. Five grains of calomel with three ounces of black draught may be given. A nasal tube is of soft rubber, about twenty inches long, with a funnel at one end. It is about eighteen inches from the nostrils to the stomach.

Passing the nasal tube entails some risk in a semi-comatose or comatose patient. Normally, when the nasal tube is passed, the soft palate is irritated by its passage, and pushes it back against the posterior pharyngeal wall, and so it is guided into the oesophagus. But if the soft palate is paralysed, as it is in these patients, this does not happen, and the tube may either appear in the mouth, or slip down the larynx. The larynx, too, is paralysed, so the presence of the tube excites no cough. You may then pour the black draught straight into the patient's lungs. To avoid this, apply the following simple test. If the tube is in the larynx, the air is forced out through it during expiration, if in the stomach, during inspiration, for the descending diaphragm squeezes the stomach and forces air or gas up the tube. By putting your ear to the funnel you both hear and feel the exit of the air when it is expelled. If the nasal tube cannot be got to enter the oesophagus, pass the stomach tube. We are not satisfied unless the bowels are opened between four and six times in the twenty-four hours. In short, we place our faith, as regards the treatment of eclampsia,

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[1] A gag can be made by wrapping a handkerchief or bandage round a piece of firewood or the handle of a spoon.

mainly in morphia and a thorough emptying of both upper and lower bowel.

How to treat a patient when the eclamptic fits have passed away, but the child is not born. The treatment is in every way identical with that described under the severer forms of albuminuria.

How to treat a patient when the eclamptic fits have passed away, and the child has been born. The treatment is again similar to that for severe albuminuria. The urine, which may have been loaded with blood and albumen, changes to normal or normal with a trace of albumen in a remarkably short time, in fact, we have known it change from the urine of acute nephritis, with blood, albumen and epithelial and granular casts in abundance, to a clear, limpid and abundant urine with a trace of albumen within twenty-four hours of the cessation of fits and recovery of the patient. She should be kept on a liquid diet for a week after the disappearance of all albumen, and should stay in bed for a fortnight after its disappearance.

Results of the present treatment at the Rotunda. The mortality in the Rotunda before the adoption of the morphia treatment from 1889 to 1892 was 27 per cent. The morphia treatment was begun in 1892. From 1892 to 1906 there have been seventy-nine cases with thirteen deaths or a mortality of 16·4 per cent.

HYDRAEMIA

Whether or not the condition of hydraemia, or watery blood, is due to the toxaemia of pregnancy cannot be said. It produces the same oedema of the legs and vulva that sometimes appears with albuminuria. There is, however, no albumen in the urine.

Signs and symptoms. It occurs late in pregnancy. The oedema may be very great and the labia swell to such a large size that the patient cannot walk and the stretched skin may even slough. If labour comes on the oedematous tissues may be badly torn.

Treatment. The treatment is to attend to the usual

hygiene of your patient, when slight oedema of the legs appears. Examine her urine, keep her bowels open once or twice a day, attend to her appetite, let her drink water and let her take some exercise unless this increases the oedema of the legs. Fresh air and good food are essential. Give her an iron tonic or malt and iron three times a day. Avoiding food that contains salt apparently diminishes oedema. If the oedema is more advanced, you must keep her in bed and treat her in the same manner. Should the labia become very swollen, wash the stretched skin carefully and lightly with soap and water and prick through the skin with a sterile surgical needle. The clear fluid will trickle out. Cover the vulva with sterile wool, and change this when it is soaked.

The oedema quickly disappears after the birth of the child.

CHAPTER VIII

THE REMAINING ABNORMALITIES OF PREGNANCY

Backward Displacement of the Gravid Uterus—Pendulous Abdomen or Anteflexed Uterus—Hydramnios—Oligo-Hydramnios — Tumours and Pregnancy — General Diseases and Pregnancy.

THESE abnormalities of pregnancy are not grouped together because they have any clinical or pathological connexion with each other, as was the case with the other two groups.

BACKWARD DISPLACEMENT OF THE GRAVID UTERUS

The normal position of the uterus is one of anteversion with slight anteflexion. When such a uterus becomes pregnant, at the end of the third lunar month it rises out of the pelvis and becomes an abdominal organ. This it does readily, for the posterior surface of the pubic arch, against which the fundus rests, does not project or overhang.

But the case is different when a retroverted uterus becomes pregnant. At the end of the third or during the first half of the fourth lunar month of pregnancy it should rise out of the pelvis and become an abdominal organ. To do this the fundus, which has been resting against the anterior surface of the sacrum, has to pass the sacral promontory. The very name of promontory shows that it projects. This, then, is the difference between an anteverted and retroverted gravid uterus, that in reaching up to the abdomen the former has no promontory or projection to pass and the latter has. Occasionally the retroverted gravid uterus fails to pass the sacral promontory, and incarceration of the gravid uterus in the pelvis occurs. Such a result is more likely to occur

the more the sacral promontory projects, hence it is more common in flattened, rickety and other contracted pelves, in which the promontory projects more than in the normal.

Retroversion is as a rule accompanied by congestive endometritis, which leads either to sterility or abortion. Consequently pregnancy in a retroverted uterus progressing beyond the third month is uncommon.

Nevertheless it does occur, and the course it pursues is of great practical importance.

Course of retroverted gravid uterus.

1. Most usually the uterus slips past the sacral promontory and follows the lines of an ordinary pregnancy.

2. The posterior wall of the uterus is bound down by adhesions, which do not yield. The anterior wall is not bound down and anterior development results; in other words, the foetus bulges the anterior wall up into the abdomen as growth progresses. The uterus thus assumes an hour-glass shape, one portion of the foetus being in the pelvic segment, the other being in the growing abdominal segment. This partial incarceration may go on to full term, by which time the adhesions are so softened that the contractions of the uterus are strong enough to pull up the pelvic segment and make its contents present at the os.

In some cases (and these must be very rare) this is said not to occur; here, when labour at full term sets in, the cervix is found looking forwards and upwards and crammed up in the anterior fornix against the pubic bone. In such cases, an attempt has been made to push the pelvic segment and its contents up out of the pelvis, and if this fails Caesarean section has been done. We have never come across such a case.

3. The growing uterus does not rise out of the pelvis, but becomes incarcerated and fills all available space in the pelvis, crushing and squeezing all the other pelvic organs. The symptoms are those of pelvic pressure.

Signs and symptoms of incarceration.

Bladder and urethra. The bladder and urethra are the organs most affected by the pressure of the gravid uterus. The normal pressure of the gravid uterus merely produces irritability of the bladder and frequency of micturition. But

the pressure of the incarcerated uterus leads first to blocking
of the urethra and retention of urine followed by overflow,
secondly to injury of the base of the bladder, which is
squeezed against the pubic bone with resulting cystitis, and
lastly to sloughing of the base of the bladder with extrava-
sation of urine, and death of the patient.

The first symptom of which the patient complains is
increased frequency of micturition. She can only hold her
water a very short time. Later she will tell you that she
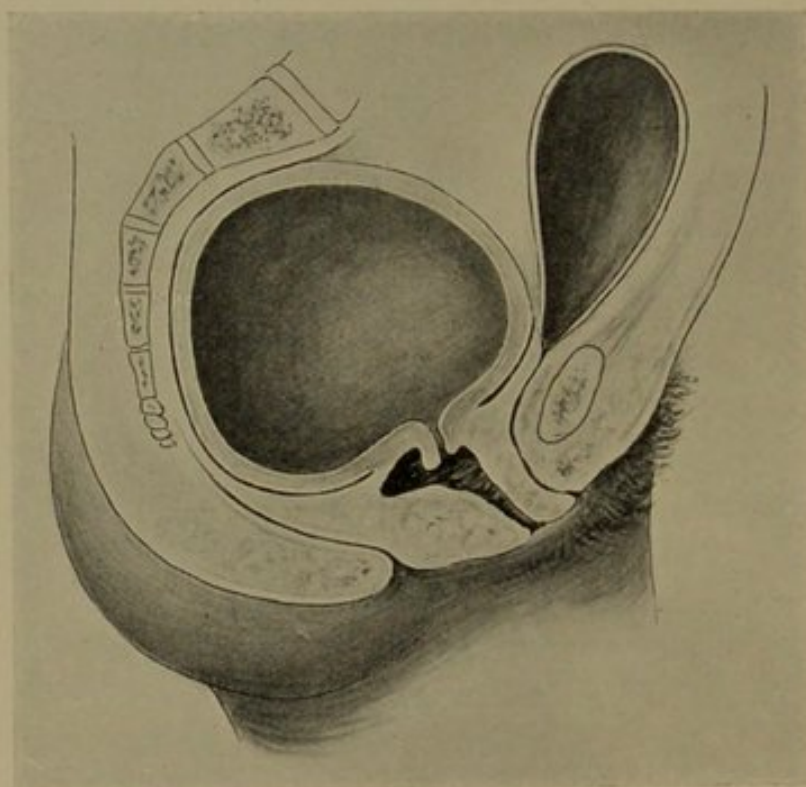
Fig. 67. Retroverted gravid uterus causing dilatation of the bladder.

has great difficulty in passing her water and has failed to
pass her water for over twelve hours, and finally she com-
plains that her water is continually passing from her and
wetting her clothes.

This first symptom may not excite your suspicion that
anything except normal pregnancy is present. But when
she says that she has missed some three or four periods and
her water is continually running away from her, and a short
time previously she failed to pass her water for a whole day,
a thorough examination is imperative. It is by the bladder

symptoms that you suspect incarceration of the gravid uterus. Pressure on the rectum causes constipation, with bearing down sensation in the back passage. Pressure on the veins causes swelling of the veins of the lower limbs, the vulva and anus. Pressure on the nerves causes shooting pains down the legs. But these symptoms are of minor importance compared to the bladder symptoms.

Examination of a patient with suspected incarcerated gravid uterus. Let her be in bed. Examine her abdomen. You will find the bladder up to or nearly up to the umbilicus. It has again and again been mistaken for an ovarian cyst or a pregnant uterus, a mistake you will not make if you follow the golden rule of always passing a catheter on a woman before you make a vaginal examination. We therefore have first to consider the use of the catheter in such cases.

How to pass the catheter. The patient lies on her left side with her hips well out to the edge of the bed, or, better, in the cross-bed position. There must be a good light. Your hands must be surgically clean and you must clean the labia and the orifice of the vulva with great care, washing them with soap and water, and washing the soap off with warm water. You sponge the orifice of the urethra thoroughly with wool soaked in biniodide of mercury (1–1000), for any germs introduced into the damaged and distended bladder have a far greater chance of setting up acute cystitis than when introduced into the healthy bladder. It is by no means always easy to find the orifice of the urethra. The distended bladder rises in the abdomen and pulls up the urethral orifice. Consequently the meatus lies within the vagina. Owing to the lengthened urethra use a No. 10 gum elastic male catheter.

To find the meatus. Remember that it occupies the centre of a transverse wavy line that divides the smooth vestibular mucous membrane from the rugose vaginal mucous membrane. This line is the base line of the vestibule, a triangular area, the sides of which are formed by the labia minora and the apex by the clitoris. Pass in a posterior speculum or three fingers as a posterior speculum to enable you to see the meatus, and then pass the catheter slowly and carefully.

Sometimes urine will not flow out after the catheter has been passed. Either (1) some necrotic mucous membrane has blocked the eye of the catheter, or (2) the catheter may have been pushed into the softened wall of the bladder itself, or (3) a female catheter may be too short to reach the bladder. Withdraw the catheter, clear it with the stylet and pass it again. A great quantity of urine will flow away and confirm your diagnosis of distended bladder with overflow of urine.

Sometimes you will fail to pass the catheter in these cases. You must then draw off the urine by supra-pubic puncture.

How to do a supra-pubic puncture. Shave off the hair over the pubes and carefully cleanse a small central area of skin with soap and water, ether and biniodide of mercury. With clean hands plunge a boiled trocar and cannula of small size boldly into the middle line, half an inch to an inch above the pubes. If the skin and instrument are clean, there is no danger, and the operation can be repeated on several occasions, if necessary.

From this it will be seen how serious the condition may be and how careful of asepsis one has to be. The rotten bladder wall foretells the death of the patient. Either rupture or perforation by ulceration leads to extravasation of foul urine; or a severe cystitis is set up, which may quickly or slowly kill the patient or lead to ascending nephritis or pyaemia.

Having emptied the bladder and ascertained that the tumour of the abdomen was a full bladder, you next proceed to make a bimanual examination. For this the patient must be in the cross-bed position.

What is felt by bimanual examination. Pass two fingers into the vagina and examine the vulva and vagina for the blueing of pregnancy. You then feel that the posterior fornix is obliterated by a large, elastic, globular swelling, which fills up the vagina. At first you will not feel the cervix, but when you remember that it is up at the summit of the vagina and faces forwards, you can usually reach it with your two fingers, but sometimes you have to use the half hand to reach it. You find the anterior vaginal wall and wall of the anterior fornix stretched. Bimanually you find that no organ occupies the place of the normal anteverted uterus.

You then proceed to exclude the rarer causes of pressure on the bladder with retention and overflow of urine.

Diagnosis. You exclude the important question of pelvic haematocele by the absence of history of bleeding or signs of internal haemorrhage, by finding that the wall of the anterior fornix is stretched, that the cervix looks directly forwards and not downwards, and that you fail to feel the anteverted uterus bimanually.

You exclude a large fibroid in the posterior wall of the uterus by the menstrual history, by the stretching of the wall of the anterior fornix, by the retroverted uterus, by the fact that the cervix looks forwards and not downwards as it does with a large fibroid, and by failing to feel the uterus bi-manually.

The signs of pregnancy also point to a retroverted gravid uterus. You exclude a fibroid in the posterior wall of the uterus associated with pregnancy, again by the difference of the anterior fornix and the direction of the cervix and by the absence of the body of the anteverted uterus.

Replacement of the uterus.

Before incarceration. When you find a backwardly displaced pregnant uterus (after emptying the bladder) but as yet there are no pressure signs, carefully exclude haematocele and replace it by the bullet forceps and finger in the rectum as described for incarcerated uterus. Keep it anteverted by a Hodge pessary until the fifth lunar month. Do this, too, if signs of threatening abortion are present. If you fail to replace it by bullet forceps and finger in the rectum, let it alone. It will most probably right itself. Tell your patient to immediately inform you of any urinary symptoms.

After incarceration. The bladder is empty. We usually attempt to replace the uterus when the woman is in the cross-bed position. There is no doubt the knee-elbow position is an excellent position, but it is a very ungainly one, and it is practically impossible to anaesthetize a patient in this position. We, therefore, try first with a bullet forceps and one finger in the rectum and one in the vagina. If this fails we give the patient an anaesthetic.

The woman, then, is in the cross-bed position, her bladder is

empty and her vagina is douched.   Put a sterile bullet forceps
on to the posterior lip of the cervix.   It is not always easy to
do this.   If you cannot reach it, catch the uterus as near the
posterior lip as possible.   Then place one finger in the rectum
and one in the vagina.   With these push the body of the
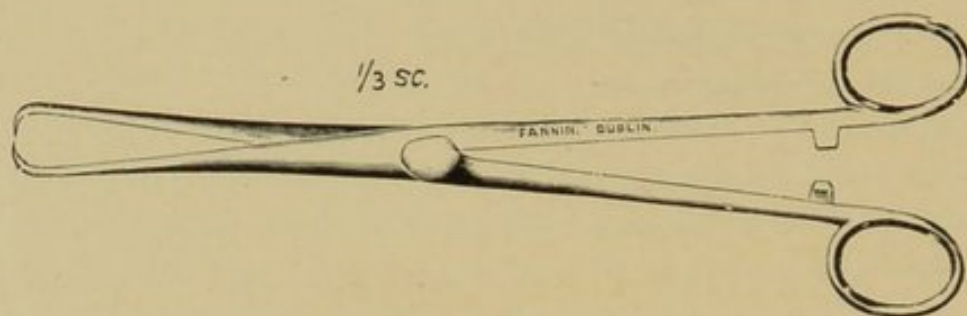
FIG. 68. Bullet forceps.

uterus upwards and to one side of the sacral promontory, and
at the same time pull the bullet forceps downwards.   If this
fails after steady pressure, or if the patient's abdominal
muscles are tense, give her an anaesthetic until there is com-
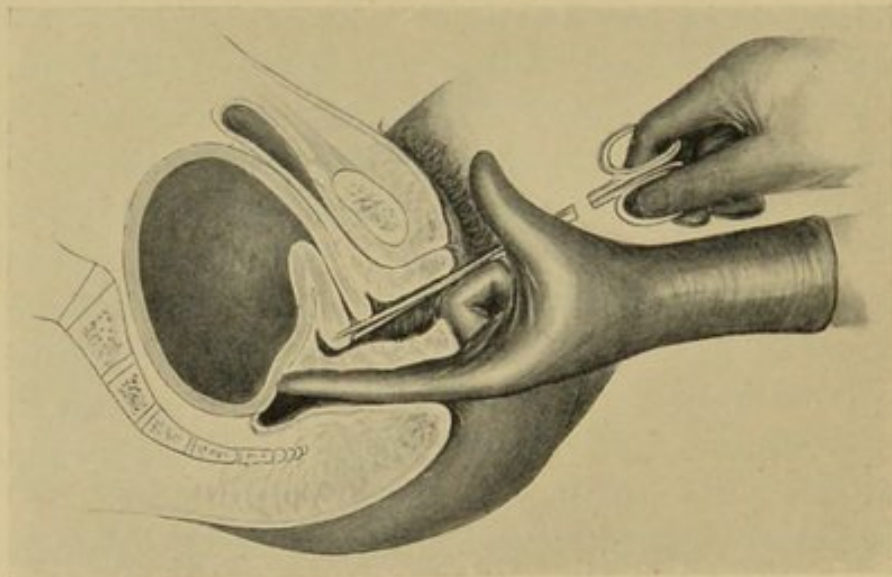
FIG. 69. Replacing a retroverted gravid uterus.

plete relaxation of her muscles. You can then put two
fingers into the rectum and try again, steadily maintaining
pressure for some minutes.

Failing replacement, we think it is better to wait for twelve
to twenty-four hours, emptying the bladder meanwhile every

six hours by a female catheter. Then repeat the same method and you will often meet with success. If you succeed, keep the uterus in position for two months with a Hodge pessary.

What to do if the second attempt fails. You are generally advised to induce abortion. This you do by pulling down the cervix with a bullet forceps and rupturing the membranes by passing a stylet or catheter with the top cut off through the cervical canal; or you pass a solid bougie between the membranes and the uterine wall. But you will often find it quite impossible to do any of these things, so jammed is the cervix against the vault of the vagina. You have then to resort to drawing off the liquor amnii by puncturing near the cervix through the posterior vaginal and uterine walls, either with an aspirating needle or with a trocar and cannula. The liquor amnii escapes, pressure is at once relieved, and abortion ensues.

In hospital we do not do this, we perform a laparotomy. We open the abdomen in the middle line, lift the uterus up and fix it in an anteverted position by ventral fixation. Adhesions can always be broken down or divided, and it seems inconceivable that the uterus could not always be brought into and kept in position in this way.

The operation of ventral fixation is described in books on gynaecology. Briefly the steps are: Prepare the patient as for Caesarian section. Open the belly by a median incision four inches long, ending half an inch above the pubic bones. Put in a long roll of warm gauze above the uterus to keep back the intestines from the field of operation. Pass the fingers down between the sacrum and the uterus, breaking down any adhesions that yield to them. Catch tougher adhesions between forceps and divide them with scissors. If the intestines are adherent to the uterus and cannot be peeled off, slice off a thin layer of the uterus with the adherent intestine rather than attempt with force to peel off the intestine, for the intestine is readily damaged. Pull the freed uterus up by the hand. Pass a fine silk suture through the peritoneum at the lower angle of the wound, then horizontally for half an inch through the fundus of the uterus, not very deeply but just deep enough to include the peritoneal surface, and finally through the

peritoneum on the opposing side at the lower angle of the wound. Catch the two ends of this suture with forceps. Pass another fine silk suture in the same way, traversing the uterus half an inch posterior to the first. Tie these sutures. Ligature any bleeding adhesions. Remove forceps. Count the swabs used. Remove the gauze roll. Fill the abdomen with sterile normal saline solution and sew up the abdomen in three layers.

A pessary in the vagina is not needed. The operation causes peritoneal adhesions to hold the uterus in place. They stretch as the uterus rises with the progress of pregnancy, but do not allow retroversion to occur.

The after-treatment is similar to that of Caesarian section, the patient being kept in bed from three to four weeks.

The operation is not as a rule a difficult one, but requires experience in abdominal surgery.

It should not be performed when acute cystitis is present, for acute cystitis frequently fails to get well as long as pregnancy persists.

Cystitis. The incarceration has been overcome, but you may yet have to deal with the inflammation of the bladder due to it. The cystitis may be very severe after the uterus has been put into position. You may have to induce abortion to save the patient's life ; or acute followed by chronic cystitis makes your patient an invalid.

Cause and sequence of cystitis. Whenever tissue gets damaged in the body, microbes are very liable to reach it and attack it. The bladder is damaged by over-distension from the retained urine and by direct pressure from the incarcerated uterus. The only path of invasion which you can in some degree control is that opened by passing a catheter, and that is why careful cleansing of the urethral orifice and the use of a sterile catheter passed by sterile hands is imperative. If the pressure has been prolonged, direct sloughing of the base of the bladder occurs, or perforation by ulceration. More commonly the patient comes to you before such grave results have ensued, but the damaged bladder, invaded by microbes, has to pass through an attack of acute inflammation.

Signs and symptoms. The patient suffers severe urethral pain when passing her water, and, owing to irritability of the

bladder, she has to pass her water frequently. There is tenderness over the bladder, if you press on it from the vagina or abdomen. The temperature and pulse vary according to the degree of inflammation. In severe cases the temperature may reach 104°, and the pulse be over 120. The patient is then exceedingly ill, both owing to the septic intoxication which threatens her life, and to the exhaustion due to the pain and loss of sleep from frequent micturition.

The urine is ammoniacal and turbid. It contains blood, pus, and epithelial débris.

Treatment. Washing out the bladder. The bladder is washed out. For this purpose we use the ordinary douche can and a small Bozemann's catheter. The patient is put in the cross-bed position, and the orifice of the urethra is cleansed. Raise the end of the Bozemann whilst the fluid flows, to empty it of air. Pass it into the bladder. Cover the exit hole of the Bozemann with your thumb and fill the bladder, until the patient feels she must pass water. Then let the fluid run out. Again fill the bladder and let the fluid run out. Repeat until the return fluid is clear. We wash out the bladder two or three times a day with warm boric lotion. An anaesthetic is not needed. Once or twice a week we inject three grains of nitrate of silver in three ounces of water, after the bladder has been washed out with boric lotion. We have found this treatment satisfactory in mild cystitis.

Drugs. Morphia or opium is needed for the severe pain of severe cystitis. Belladonna, hyoscyamus, benzoate of soda, cubebs, buchu, are used as in other cases of cystitis. Urotropine gr. x t. d. s. in a tumbler of hot water is recommended, and we think does good.

Severer cystitis. When the cystitis is severe, the bladder is intolerant of this treatment. You cannot adopt it when it causes great pain or increased irritability. Your treatment is then to make a vesico-vaginal fistula and drain the bladder through the vagina.

Operation for making a vesico-vaginal fistula. The patient is anaesthetized. She is put in the cross-bed position, with the buttocks projecting well over the edge of the bed and the flexed legs held by assistants or by a Clover's crutch. Still better,

she is put on a table in the gynaecological position. A mackintosh runs from under her into a large bath, the preparations, in short, being similar to those for emptying the uterus in abortion. Douche the vagina and then pass a catheter. Make a longitudinal incision for one inch through the anterior wall, starting your incision midway between the cervix and the urethral orifice. Cut down directly on to the catheter and expose it. Keep the fistula open by oversewing its edges with interrupted silkworm gut sutures.

After-treatment. Place pads over the vulva to receive the urine and see that they are constantly changed. Keep the patient in bed. Attend to the bowels and diet. The relief the patient receives from the operation is very great. The difficulty is to keep the fistula open, for in spite of the septic fluid that flows over its edge, it tends to close to a small hole. If the bladder is tolerant, douche out the bladder through the fistula twice a day. When the cystitis is almost well, you can douche through the urethra. When it is well, take out the stitches, if they have not already cut through, and the fistula heals naturally or after paring and uniting its edges.

Induction of Abortion. When cystitis exists together with an unemptied uterus, the cystitis often goes from bad to worse. The question of induction of abortion then arises, and we think it is as a rule too long deferred. In our experience, if the above treatment does not relieve the patient, the presence of pregnancy, whether owing to pressure or congestion, adds so greatly to her danger that a fatal termination is inevitable. The danger of sepsis after induction of labour is, of course, considerable, but we think it the lesser evil of the two. Therefore, if the treatment given does not relieve the patient, we advise you not to defer producing abortion.

The method we recommend is to dilate the os with Hegar's or Frommer's dilators, so as to be quick, with very thorough scrubbing of the vagina with soap and water before the douche; or, as in the case of hyperemesis, you can start by putting in laminaria tents for five or ten hours.

ANTEFLEXED UTERUS OR PENDULOUS ABDOMEN

During the later months of pregnancy the uterus falls forward (1) when there is a markedly contracted pelvis, (2) when the abdominal muscles of a multipara are very lax. The treatment is to give the patient an abdominal belt, and when you find the condition present in a primipara or in a multipara who has had very difficult labours, to measure her pelvis.

HYDRAMNIOS OR POLYHYDRAMNIOS

Hydramnios is the condition where there is excess of liquor amnii. The normal amount of liquor amnii is about two pints.

Causes. The causes of hydramnios are not really known, and at present it is impossible to foretell or prevent the onset of hydramnios. Syphilis is held to be a common cause. Foetal malformations, such as hydrocephalus, anencephalus, spina bifida, and clubfoot, not infrequently accompany hydramnios. It is more common in multiparae than primiparae.

Onset. The onset may be either acute or chronic. The chronic is by far the commoner. The acute hydramnios comes on within twenty-four hours or a few days. Acute hydramnios may cause trouble as early as the sixth lunar month of pregnancy.

Symptoms and signs. The patient suffers from pressure symptoms, owing to the increased size of the uterus. These are more marked when the onset is sudden. She has great difficulty in breathing and has to be propped up by pillows at night. Her circulation is impeded, her lips are blue, and her hands and feet are cold and blue. Her legs swell. She has indigestion and vomiting. Albumen often appears in the urine.

If the formation of the fluid is slow, the system gradually accustoms itself to the increasing size of the uterus, and we have ourselves measured twenty-six pints of amniotic fluid, which came from a woman who did not show marked symptoms of pressure.

When you examine her abdomen you find the uterus larger than usual and more round. It is difficult to detect the out-

line of the stretched uterus in many cases. You can get a marked fluid thrill, but the outlines of the foetus, the foetal movements and heart sounds, are obscured or obliterated. By a vaginal examination you obtain distinct ballottement, even at full term. The tumour is too large for a big bladder and you distinguish it from ovarian cyst by the signs of pregnancy and the history.

Results. The overstretched uterus often discharges its contents before full term, and so premature labour is common. During labour the presenting part is not grasped by the lower uterine segment, and the foetus floats in the liquor amnii. When the waters break, the rush of waters carries down with it the part of the foetus nearest the internal os. Malpresentations and prolapse of the cord, therefore, are common. The overstretched uterus contracts badly, hence the delivery of the placenta may be delayed and the absence of proper contraction and retraction favours the occurrence of post-partum haemorrhage.

Treatment. If the pressure symptoms are severe and the woman's life threatened, the uterus must be emptied. Moreover, the only justifiable way of inducing labour is to rupture the membranes. If you find hydramnios when the patient is in labour— for the os is always open owing to the pressure of the fluid—you should also rupture the membranes in the manner to be described, so that you may have control of the rush of liquor amnii.

How to rupture the membranes in hydramnios. Put the woman in the cross-bed position and empty her bladder. An anaesthetic is not necessary but is advisable; nor is it necessary to douche the vagina, for the escaping liquor amnii does this. Cleanse your hands and the external genitalia, as before a vaginal examination, and have a sterile catheter stylet ready to hand.

Lubricate the gloved hand with soap and pass the whole or half hand into the vagina. Pass your forefinger into the cervical canal and through the internal os, which will always be opened sufficiently to permit its passage. Pass it between the membranes and uterine wall, as far up as you can. Then taking the catheter stylet in the other hand, run it up to the

intra-uterine forefinger. Scratch through the membranes as high as possible in the uterus with its point. By this high puncture the outflow of fluid is controlled. The contracting uterus presses down on the hole in the membranes and lessens the outflow of fluid. Another method of control is to keep your hand in the vagina. The vagina contracts round your hand, and thus you plug the vagina and can allow the fluid to run out slowly. Allow as much fluid to escape as will. When the patient is in the recumbent position and the labour pains are absent or slight, a lot of fluid will remain in the uterus. Feel in order to assure yourself that either the breech or vertex presents and that the cord is not prolapsed. If any abnormal presentation or prolapse of the cord is present, treat it according to prescribed rules. Leave the woman in bed. Labour very probably will start within twenty-four hours and the child be delivered naturally.

Sometimes hydramnios occurs in one sac of twins and you cannot reach it, because the sac of the other twin presents. In that case rupture the membranes of the first twin. When the first child has been delivered, treat the second sac according to the above rules.

OLIGO-HYDRAMNIOS

More rarely there is a diminution in the amount of amniotic fluid. The results to the mother are that the foetal movements, not being checked by the liquor amnii, are more painful, and secondly that, the dilating bag of waters being absent, labour is prolonged. The results to the child are those due to amniotic adhesions, which form when the child is in direct contact with the membranes. Amputations of the foetal limbs and other horrible deformities ensue.

It is not possible to prevent, diagnose, or treat oligo-hydramnios. The presence of adhesions causing deformity of the child when born, and the absence of sufficient liquor amnii give the name to the condition.

TUMOURS AND PREGNANCY

Ovarian cysts. Ovarian cysts, when diagnosed during pregnancy, should be removed. They are apt to obstruct labour or be seriously damaged by the process of labour. They become twisted, gangrenous, suppurative, or filled with blood. Sometimes they produce such serious symptoms during labour that they have to be removed in spite of labour. Especially is this the case when they obstruct labour. Sometimes they can be pushed out of the way and sometimes they may be aspirated. The rules then for ovarian cysts occurring with pregnancy are—

1. If discovered during pregnancy—ovariotomy.

2. If discovered during labour and causing obstruction: (*a*) attempt to push the tumour out of the way of the advancing foetus from the vagina, (*b*) if this fails and the tumour is below the foetus, puncture it through the vaginal wall with a trocar and cannula, (*c*) both failing, do an ovariotomy in spite of labour.

3. Watch an ovarian cyst carefully throughout the puerperium, so that any evil change produced in it by labour may be recognized early and treated.

Myomata. Myomata are common tumours and therefore not infrequent with pregnancy. The submucous and interstitial myomata tend to produce abortion or sterility from the endometritis that they cause. But their frequency is greater than the sterility they produce. They may by the addition of their bulk cause pressure on the bladder, with retention of urine, in the earlier months of pregnancy, in which case the patient must be made safe and well, without regard for her pregnancy. The excessive menstruation they tend to produce is repeated in their tendency to cause accidental or post-partum haemorrhage. Their interference with contraction and retraction of the uterus results in a further liability to post-partum haemorrhage. The alteration in shape of the uterus caused by them leads to malpresentations. If they are damaged by labour they suppurate, mortify, and lead to sepsis. Rupture of the uterus has been laid to their charge.

Myomata of the cervix or lower uterine segment cause complete obstruction to labour. Pedunculated subserous tumours pass into the pelvis in front of the child and cause complete
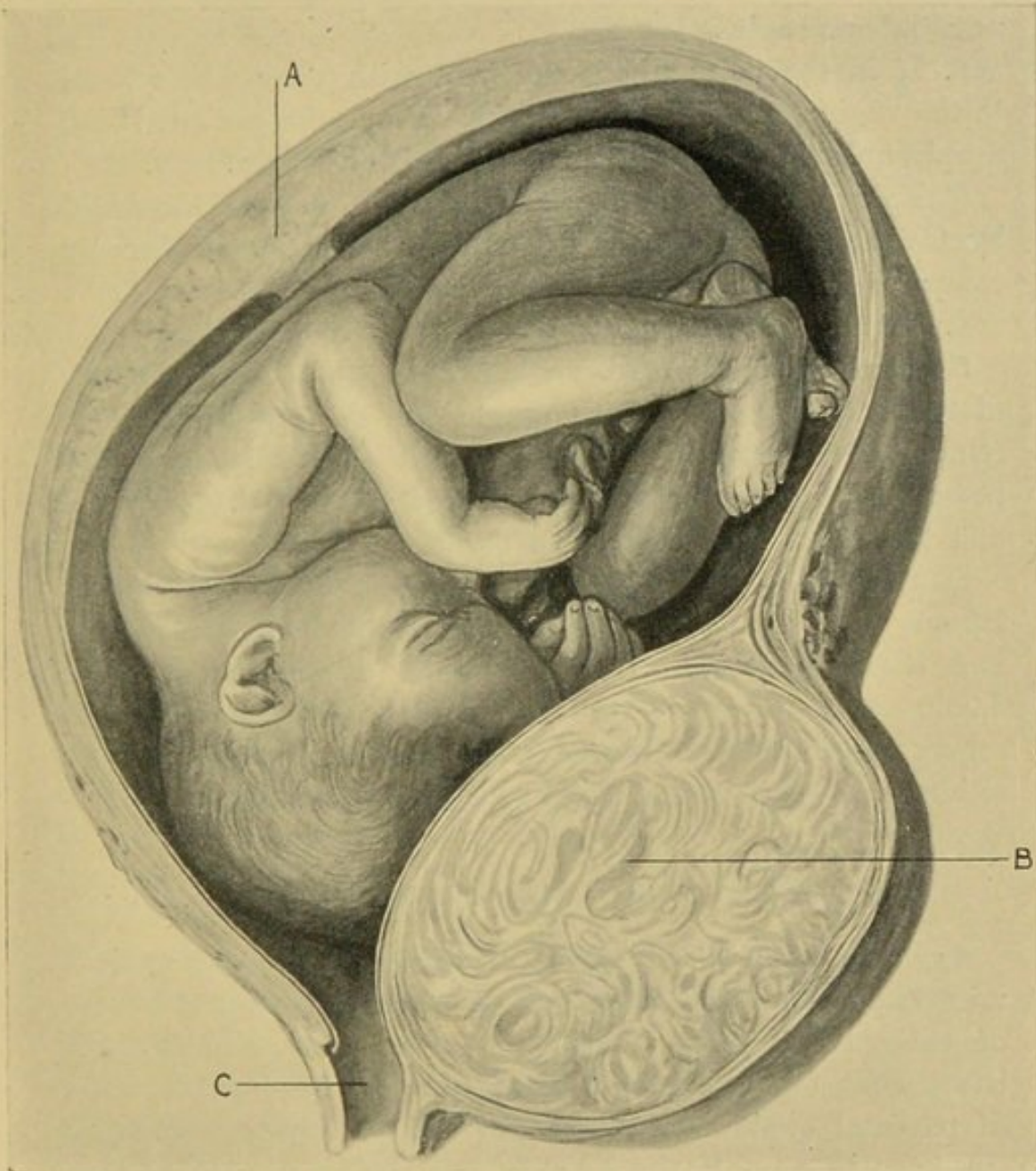

FIG. 70. Myoma causing obstruction to labour. A, placenta; B, myoma; c, cervix. (Rotunda specimen.)

obstruction, or their pedicles become twisted during labour and they bleed, suppurate, or become gangrenous. These sequelae show what a serious complication the presence of a myoma may be. Yet when small or situated above the

lower uterine segment, labour is often in no way interfered with by them and they escape damage.

Treatment :

1. If a myoma is discovered during pregnancy, leave it until labour begins.

2. If in the pelvis during labour, with your whole hand in the vagina or two fingers in the rectum, the patient being deeply anaesthetized, attempt to push it out of the way.

3. Failing this, open the abdomen and remove the child by Caesarian section. Then remove the uterus either by complete or supra-vaginal hysterectomy.

4. Watch a myoma carefully during the puerperium.

Sarcoma or carcinoma. When malignant disease of the uterus is diagnosed during pregnancy, the treatment is to remove the uterus by the most complete total hysterectomy possible. If the growth is left, the child will probably die and the disease progress with great rapidity.

If malignant disease of the cervix is diagnosed during labour, the child should be delivered by Caesarian section and the uterus removed by a total hysterectomy. The damage caused by pulling the child through the cancerous cervix will in nearly all cases lead to the death of the mother either from sepsis or the rapid spread of the carcinoma.

GENERAL DISEASES AND PREGNANCY

Syphilis. Syphilis is one of the great causes of abortion, miscarriage, and still-birth. It is most active as a cause of early interruption of pregnancy when the infection of the parent or parents has been recent. The investigation of parental syphilis must be caried out with tact, for any suspicion of parental immorality may bring unhappiness to a home.

The post-mortem changes by which syphilis may be recognized in a stillborn child are the changes of the cartilage at the junction of the diaphyses and epiphyses of the long bones and the ribs. This line, instead of being the thin, regular, blue line, becomes a thicker, irregular-edged, yellow line. Normally, it is about 0·5 mm. thick, but when affected

by syphilis it is four or five times as thick as this. The liver is enlarged, and on section cuts firmly, and has a more translucent appearance than normal. So that when you get a stillborn child, and can examine the cartilages and liver, it is as well to do so. The signs of congenital syphilis are described in textbooks of surgery, and very briefly on p. 418 of this book.

When clear indications of syphilis have been found by you, both parents will require treatment. Sometimes, when no other cause of early interruption of pregnancy can be found, giving the mother mercury and potassium iodide throughout pregnancy will bring her to full term.

Gonorrhoea. If gonorrhoea is diagnosed either before or after conception, it must be thoroughly treated. In such a case, too, you should douche the vagina before the birth of the child, and be especially careful in the treatment of the child's eyes.

Phthisis. Phthisis of the mother in no way prevents her from becoming pregnant. During pregnancy her general condition frequently improves, but she is apt to go down hill after the child is born.

The induction of abortion is rarely undertaken in cases of phthisis, unless the patient is desperately ill. Again, if the mother is very ill, premature labour may be induced to save the child's life.

If labour is in any way prolonged, terminate it artificially. The infant must not be nursed at the breast.

Heart disease. The later months of pregnancy and the effort of labour has a very detrimental effect on a diseased heart. Therefore, if during pregnancy there is any sign of failure of compensation, first restore the heart, and then induce labour. If the patient goes to full term, do not let her be longer than is necessary in labour. If labour breaks down the compensation of the heart, and the patient lives to become pregnant again, induce abortion.

Diabetes. The existence of diabetes in a woman as a rule prevents her from becoming pregnant. If she becomes pregnant, abortion is likely to occur. The toxaemia of pregnancy and the toxaemia of diabetes combine to render

the patient dangerously liable to diabetic coma. Lactose is not infrequently found in the urine during the later months of pregnancy. It is important to distinguish it from the glucose of diabetes. Glucose is fermented by yeast, but lactose is not.

Chorea. Chorea sometimes occurs in pregnant women. If it becomes severe, and does not yield to medical treatment, the uterus must be emptied under chloroform. This frequently cures the chorea, but does not always do so.

Infectious diseases. Infectious diseases when severe, and especially when accompanied by high fever, frequently lead to the death and expulsion of the ovum. Enteric fever, smallpox, and others, may be transmitted to the foetus in utero. During labour great care must be taken to guard against sepsis, and, with strict aseptic precautions, labour must be terminated as early as possible, if the mother is exhausted. Pneumonia is a dangerous complication of pregnancy both to the mother and child.

Pyelitis and pregnancy. Pyelitis, due to bacillus coli, is a rare occurrence in pregnancy.

The onset is sudden, with pain and tenderness on pressure in the loin, and some fever. The urine is acid and contains pus. Bacillus coli is found in pure culture in the urine.

The cases get well when treated with rest in bed, milk diet, slight purgation, and urotropine in ten grain doses three times a day.

PART III

ABNORMAL LABOUR

CHAPTER IX

PRESENTATIONS AND MECHANISMS

GENERAL CONSIDERATION OF PRESENTATIONS AND MECHANISMS

BEFORE proceeding to describe abnormal presentations and their treatment, we must give a brief account of the presentations and their mechanism, and for this purpose, and for the sake of comparison, must include normal presentations and their mechanism also.

Presentations and positions. The first vertex presentation is when the vertex presents, and the occiput and back are in front and to the left. In Vertex II the occiput and back are in front and to the right, in Vertex III the occiput and back are behind and to the right, and in Vertex IV behind and to the left. The head, in fact, swings round the circle of the pelvis, and the occiput occupies severally one of the four quadrants.

From these four vertex presentations, the rest of the presentations may be induced. Thus the four different positions of the brow are similar to those four vertex presentations, only the head is neither flexed nor extended, and the brow presents. The four face presentations are similar to the four vertex presentations, only that the head instead of being flexed is extended. The four transverse arise from the four vertex by pushing the head out of the pelvic brim into the corresponding iliac fossa or loin. Thus, in a first transverse, the occiput and back are to the left and in front, but the head is not in the pelvic brim. The four breech presentations are the same as the vertex, only the child is reversed.

Thus we have—

Vertex I.   The vertex presents, the occiput and back are to the left and in front.
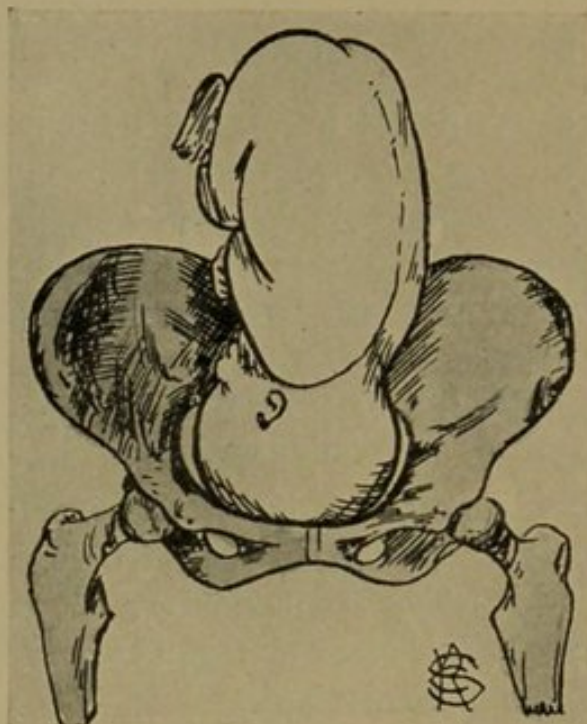

Fig. 71. Vertex I.

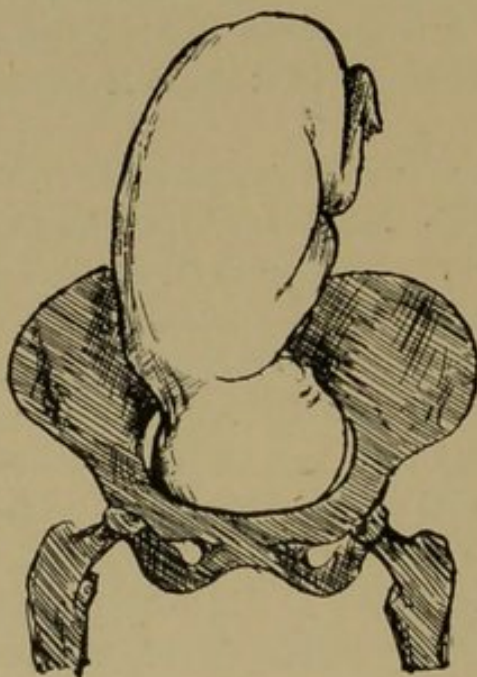Vertex II.   The vertex presents, the occiput and back are to the right and in front.

Fig. 72. Vertex II.

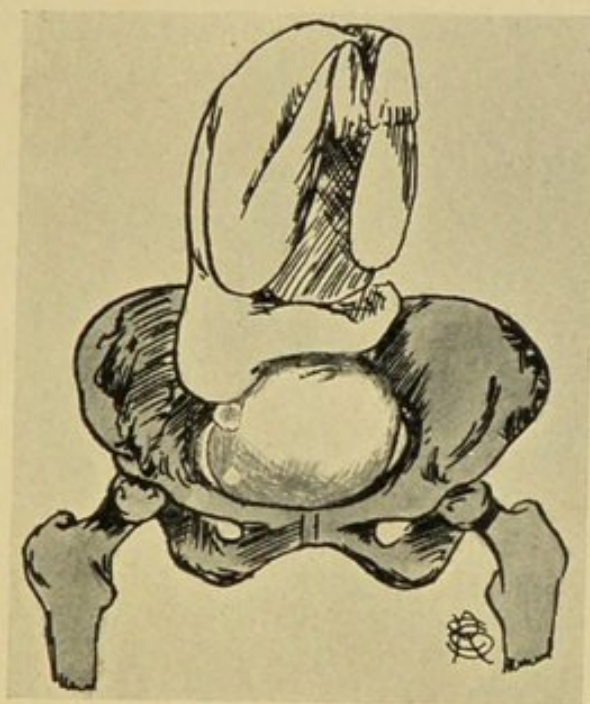Vertex III.   The vertex presents, the occiput and back are to the right and behind.

FIG. 73. Vertex III.

Vertex IV.   The vertex presents, the occiput and back are to the left and behind.
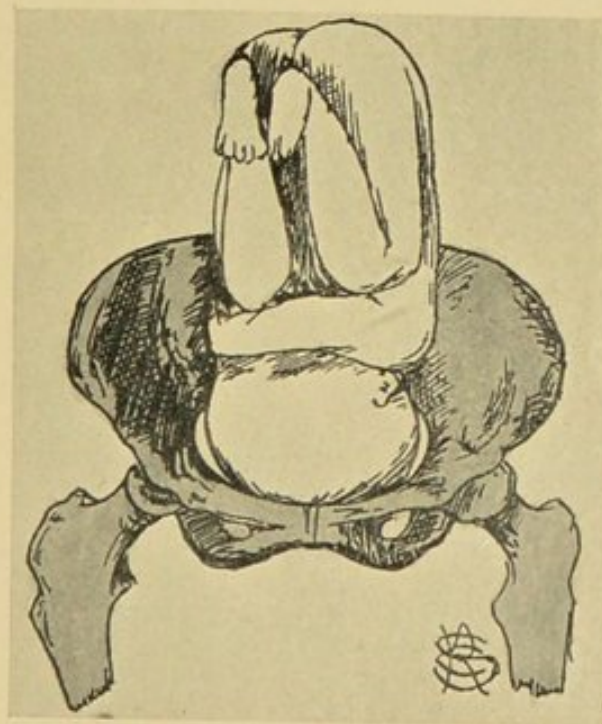

FIG. 74. Vertex IV.

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Slightly extend the head: Vertex I becomes Brow I. Vertex II becomes Brow II. Vertex III becomes Brow III. Vertex IV becomes Brow IV.
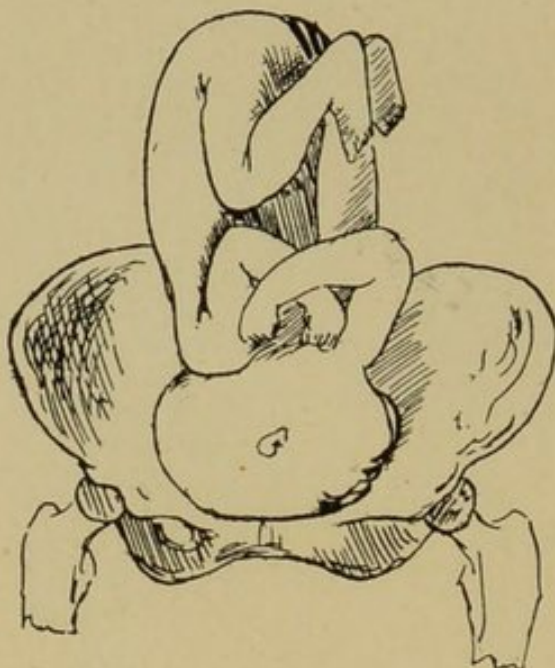

Fig. 75. Brow II.

Fully extend the head : Vertex I becomes Face I. Vertex II becomes Face II. Vertex III becomes Face III. Vertex IV becomes Face IV.

Fig. 76. Face I.
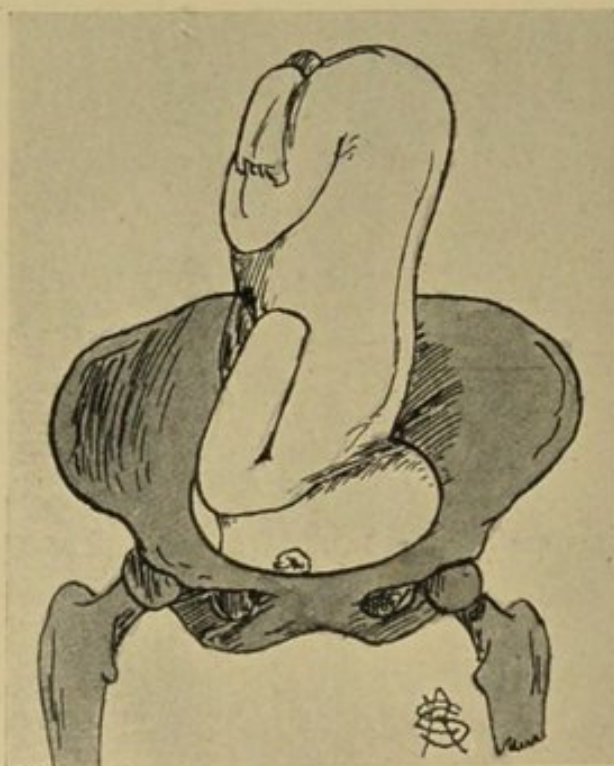
Push the head into the iliac fossa or loin to which the occiput is directed: Vertex I becomes Transverse I. Vertex II becomes Transverse II. Vertex III becomes Transverse III. Vertex IV becomes Transverse IV.
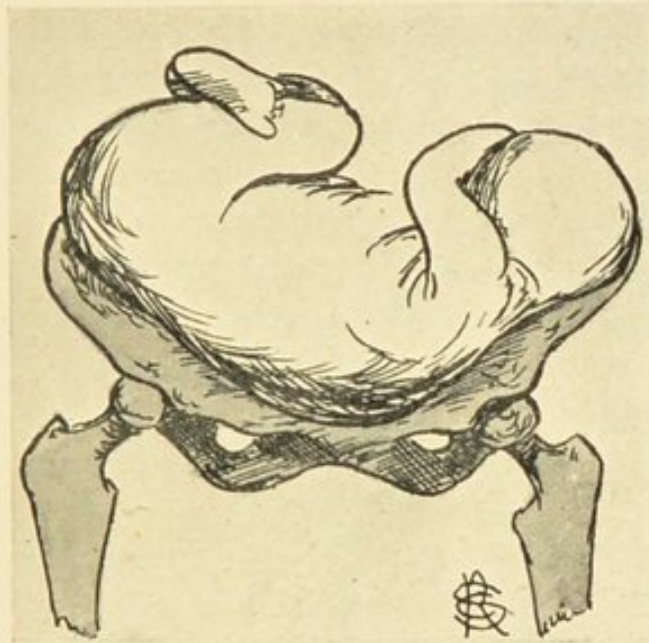

Fig. 77. Transverse I.

Reverse the child: Vertex I becomes Breech I. Vertex II becomes Breech II. Vertex III becomes Breech III. Vertex IV becomes Breech IV.
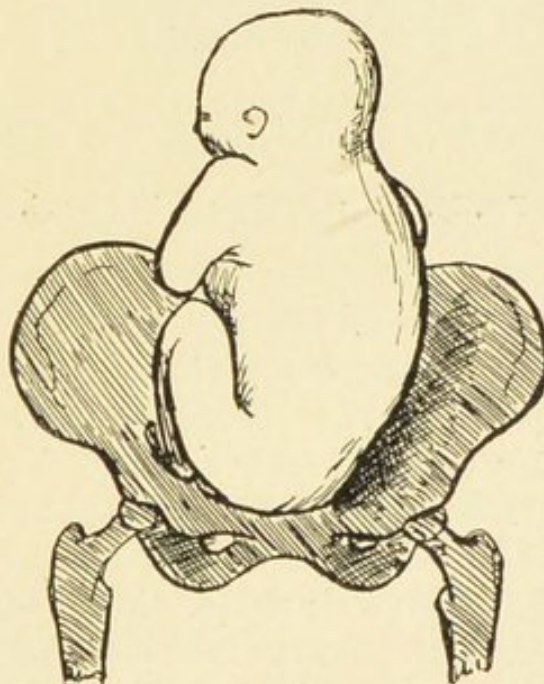

Fig. 78. Breech I.

Mechanism. A normal presentation is when the vertex presents, and the child's head is born with the occiput in front and the face towards the mother's sacrum. All other cases are abnormal. Abnormal cases are not the result of chance. There is something abnormal in the conditions present. Neither do all abnormal presentations need assistance; indeed, with the exception of transverse presentations, all the others may be delivered by the natural efforts within twenty-four hours.

What is meant by a normal pelvis and a normal foetal skull? A great number of pelves and foetal skulls have been measured and a general average struck. The mechanism
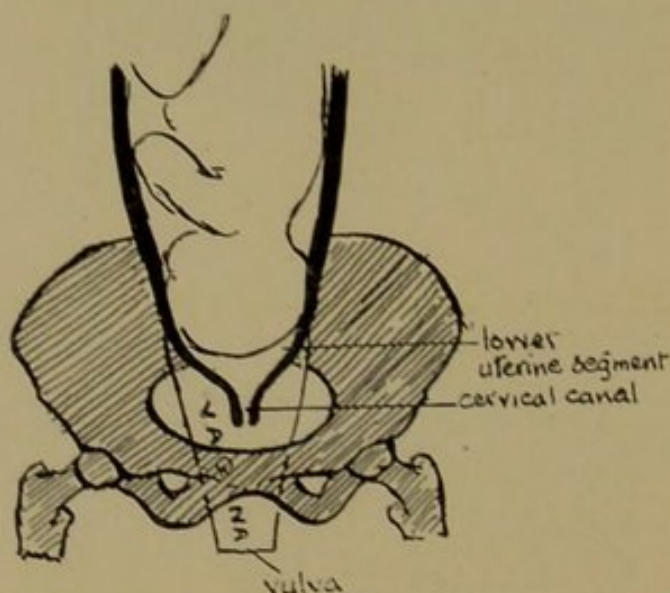
Fig. 79. Diagram of parturient canal.

which brings about the best adaptation of the foetal head to the pelvis, in these average cases, is the common mechanism, and is called the normal. Minute accuracy of average measurements have no practical value, for they do not apply to individual cases. The problem that presents itself in the study of the mechanism of labour is how the head is usually adapted to the pelvic canal in its passage, and in what way the normal is departed from in abnormal cases. The inner parturient canal formed by the soft tissues is dilatable.

Measurements of the pelvis.   The average measurements of the pelvic inlet are—

1. Antero-posterior, or true conjugate diameter, from the sacral prominence to the nearest part of the pubic symphysis —4 inches.

2. Oblique diameter from one sacro-iliac synchondrosis to the pectineal eminence on the opposite side—5 inches.

3. Transverse diameter, the greatest available width of the
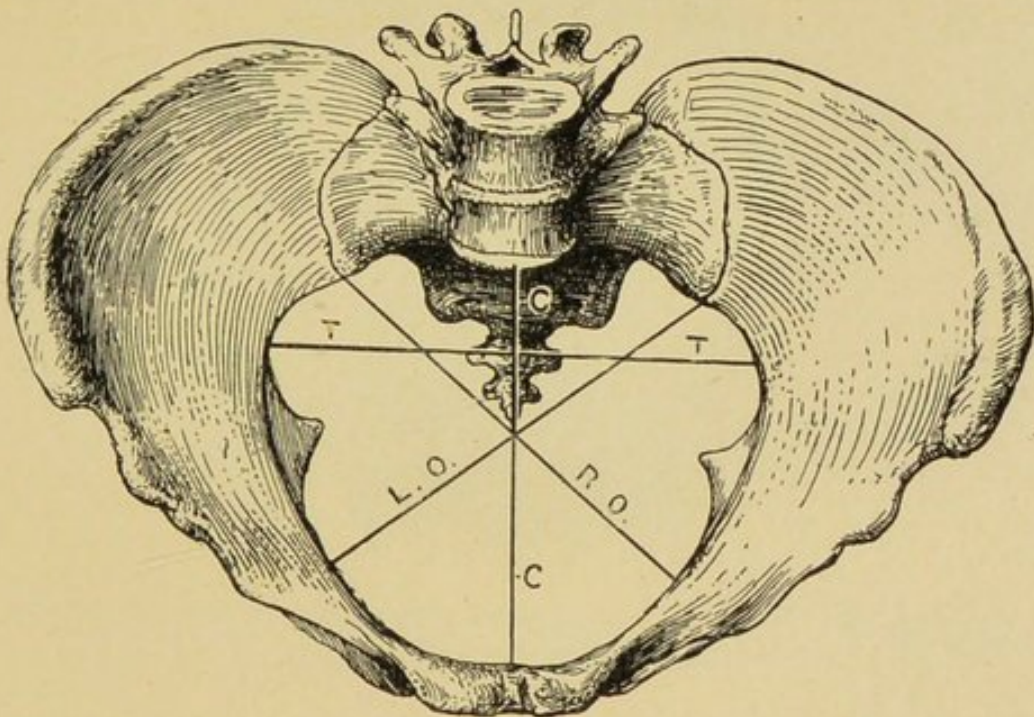
FIG. 80. The pelvic inlet.   T, transverse diameter ; L.O. and R.O., left and right oblique diameters ; c, true conjugate diameter.

pelvic inlet—5 inches.   The word available is used, because the sacral promontory pushes the head forward to the mid-transverse diameter, which is 5 inches.   The diameter of the transverse, a little posterior to the centre, is $5\frac{1}{4}$ inches.   *The transverse diameter is in reality a little smaller than the oblique, owing to the encroachment of the big muscles of the iliac fossa, which make its practical measurement $4\frac{1}{2}$ inches.*

In the centre of the pelvic canal the measurements are practically unimportant, for obstruction occurs either at the inlet or outlet, but not in the cavity.

At the outlet the measurements are—

1. Antero-posterior from the tip of the last sacral vertebra to the centre of the lower border of the symphysis pubis— 5 inches.

2. Oblique—there are no bony points in the oblique diameter and therefore it has no practical importance.
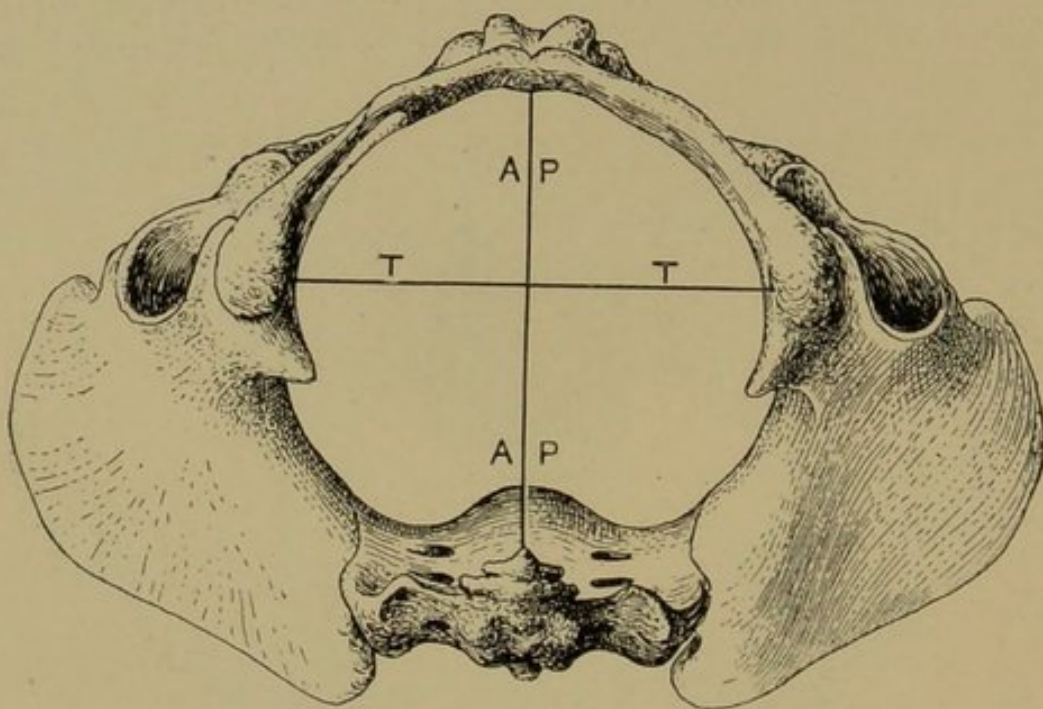
Fig. 81. Pelvic outlet. T, transverse diameter; A.P., antero-posterior diameter.

3. Transverse from the inner border of one ischial tuberosity to the inner border of the other—4 inches.

	Inlet.	Outlet.
Antero-posterior	4 inches	5 inches
Oblique	5 inches	—
Transverse	5 inches	4 inches

Foetal skull measurements. When the head is fully flexed, the suboccipito bregmatic diameter, which is $3\frac{3}{4}$ inches, engages. In other words, the largest section of the foetal head that has to pass, has for one diameter the suboccipito-bregmatic diameter, which is $3\frac{3}{4}$ inches, and for the other diameter the inter-parietal diameter, which is also $3\frac{3}{4}$ inches. When the head is less flexed, the suboccipito frontal diameter, which is 4 inches, engages; still less flexed, the occipito-frontal $4\frac{1}{2}$ inches; and

neither flexed nor extended, the mento-vertical, which is
5¼ inches. But when the head becomes fully extended, the
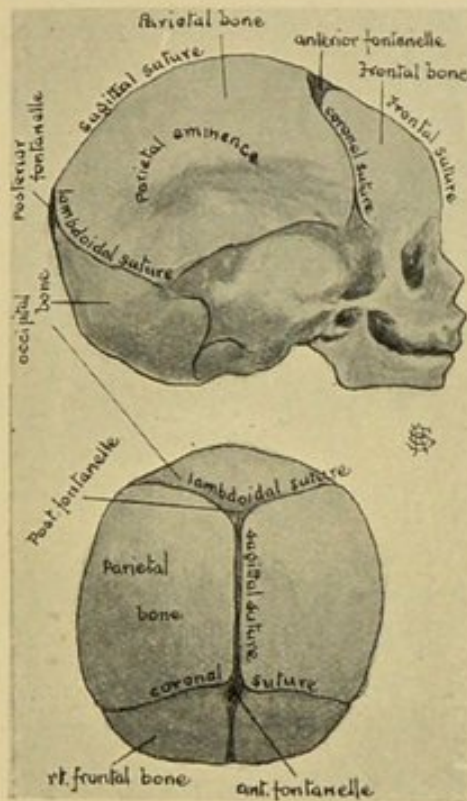
FIG. 82. The foetal skull.

cervico-bregmatic diameter passes, which measures 3¾ inches.
To all these sections, the interparietal diameter of 3¾ inches
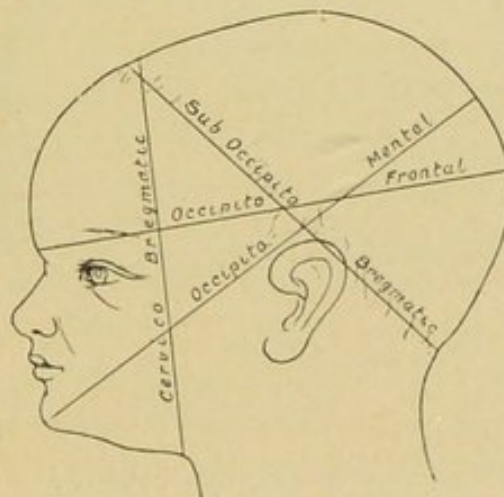
FIG. 83. Diameters of the foetal head.

is common. The difference between a flexed head and a head
between flexion and extension, as regards the ease of fitting

into the brim, is much the same as the difference of the
fit of an egg into an egg-cup, according as it is put in in
the ordinary way or across the egg-cup.

AB = Sub-occipito bregmatic diameter 3¾"

CD = vertico-mental diameter, 5"
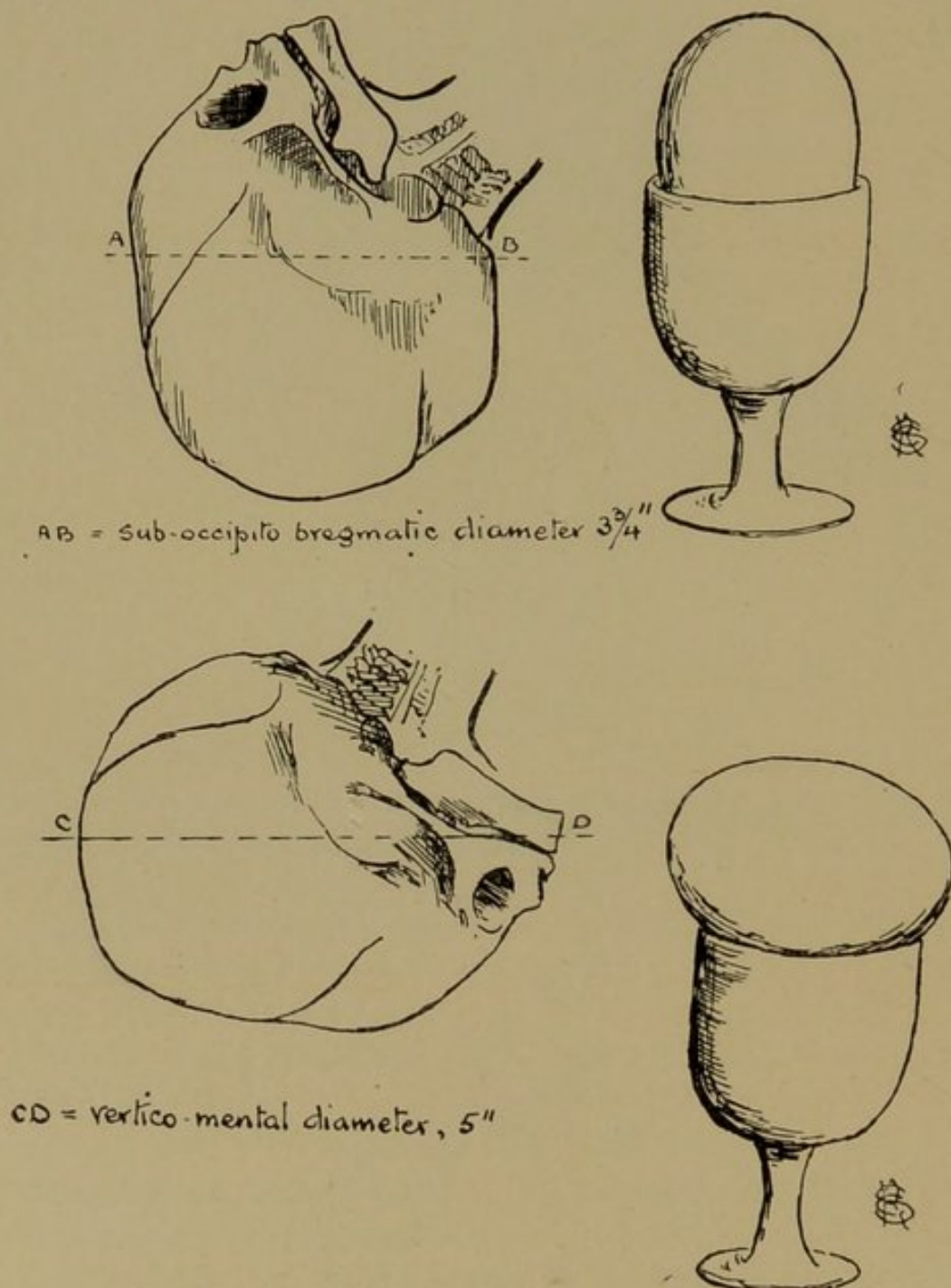
FIG. 84. Diagrams showing egg-shape of foetal head.

**What you learn from pelvic and foetal skull measure-
ments.** You learn from these measurements that the longest
diameter of the foetal skull will lie along one of the oblique

diameters of a normal pelvis, for the oblique diameters are the largest diameters of the normal pelvic inlet. You also learn that a fully flexed head has more chance of passing through the pelvic canal than has one that is less flexed. Thus, if it is a very tight squeeze for the head, the head will be fully flexed, and the presentation that known as the posterior fontanelle. But the more roomy the pelvis, the less need is there for the foetal head to flex, and we have known a primipara deliver herself of a full term child, whose head was neither flexed nor extended (brow), fifteen minutes after the full dilatation of the os. The question is therefore a relative one, but with an average pelvis and an average foetal head, it is necessary that the latter should be sufficiently flexed to allow the suboccipito-bregmatic diameter of $3\frac{3}{4}$ inches or suboccipito-frontal of 4 inches to be the largest diameter to pass the inlet of the pelvis. Less flexion than this, resulting in either anterior fontanelle presentation (occipito-frontal diameter $4\frac{1}{2}$ inches) or brow (occipito-mental diameter 5 inches), as a rule leads to difficult labour or fails altogether to pass the pelvic inlet. Full extension, on the other hand, resulting in face presentations (cervico-bregmatic diameter $3\frac{3}{4}$ inches) passes readily through the pelvic inlet, provided the inlet is not smaller than normal.

Looking again at the average measurements of the pelvic canal and outlet, we see that when once the foetal head has passed the brim, there is no narrowing of the pelvis, and therefore no reason why the head should not pass through the canal and pass the outlet in a normal case. So too, if a less flexed head passes the inlet without difficulty, it will as a rule be delivered without difficulty. Greater flexion may occur in the canal, but this only improves matters and allows a smaller diameter to pass ; or a brow may flex or extend, and this, again, makes the passage of the head easier.

When the face passes the brim, the case is different. If the chin is in front against the pubis the cervico-bregmatic diameter $3\frac{3}{4}$ inches (sometimes the cervico-occipital 4 inches) is the largest to pass, and all goes well. But if the chin points backwards and remains directed backwards, the neck enters the pelvic cavity with the head and adds $1\frac{1}{2}$ inches

to the cervico-bregmatic diameter. The head gets jammed
and further progress becomes impossible.   (Fig. 87, p. 191.)

Once again by comparing these measurements you learn
that the longest diameter of the head, which at the pelvic
inlet lies in the oblique diameter, for this is the longest
diameter of the brim, will as it nears the outlet tend to lie
in the antero-posterior diameter, for this is the longest
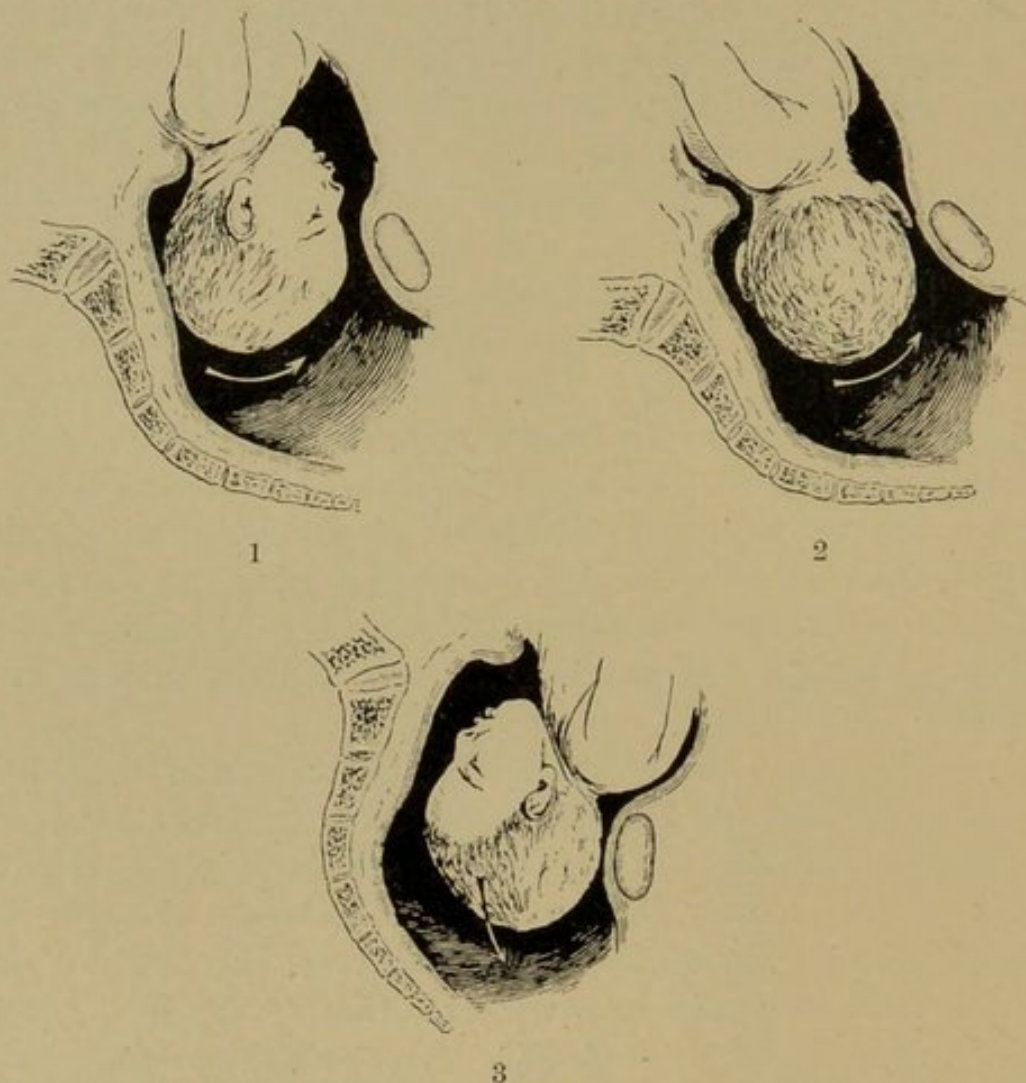
Fig. 85. Diagrams to show the most advanced part of the foetus being
pushed to the front.

diameter of the outlet.   Rotation of the head then takes
place during its passage through the pelvic canal. It is,
in fact, a definite rule of the mechanism of labour—and one
very useful to remember—*that the most advanced part of
the foetus, when it reaches the pelvic floor, is turned and
pushed to the front by the levator ani and other muscles that
form the pelvic floor.*

We will now deal briefly with the different mechanisms.

The mechanism of vertex presentations. When the vertex presents, flexion of the head enables the smallest diameter to pass. The desired flexion is brought about— (1) because the part of the foetal head in front of the occipito-atlantal joint is longer than that posterior to the joint, (2) because the slope of the head posteriorly is greater than the slope of the head anteriorly. Consequently, when the head is pushed downwards by the contractions of the uterus, the resistance to its progress acts with more force on the anterior part of the foetal head, because it is the
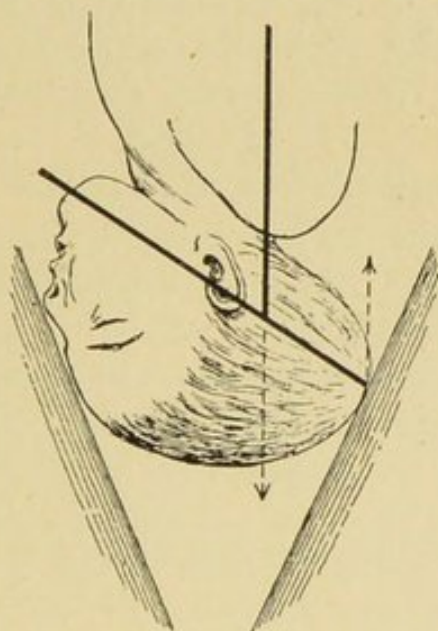
Fig. 86. Diagram to illustrate flexion of the head (due to the greater part of the head being anterior to the occipito-atlantal joint).

long arm of the lever and its slope is less. The occiput therefore advances more rapidly than the forehead and flexion results. The suboccipito-bregmatic or suboccipito-frontal diameter lies in one of the oblique diameters; and the sagittal suture, the direction of which is parallel to the foetal diameter, lies in one of the oblique diameters. As the head is pushed down (**Descent**) the pelvic floor pushes the lowest part, the occiput, to the front, and the suboccipito-bregmatic comes to lie in the antero-posterior diameter (**Internal Rotation**). The occipital protuberance is against the pubic arch, and the flexed head extends and so is born through the vulva

(**Extension**). The head twists a little on the neck to perform **Internal Rotation**, and as soon as it is born, the neck untwists with a little jerk (**Restitution**). The shoulders now lie in the other oblique diameter of the brim. As they descend they too come to lie antero-posteriorly. The head outside the vulva follows their movement and turns a little more in the same direction as the jerk of Restitution (**External Rotation**). The anterior shoulder then fixes against the pubic arch and the posterior shoulder sweeps over the perineum and is born, or both shoulders pass the vulva at the same time. The trunk and body follow quickly.

The movements of the mechanism of normal labour are therefore (1) Flexion with Descent, (2) Rotation of Occiput to the Front, (3) Extension, (4) Restitution, (5) External Rotation.

Occipito-posterior. When the occiput is posterior and flexion is partial the occiput remains posterior. With good flexion the occiput is the most advanced part of the foetus, and according to the rule is turned to the front by the muscles of the pelvic floor. But when flexion is partial, the forehead becomes the most advanced part of the foetus, and is, consequently, pushed to the front by the muscles of the pelvic floor. This partial flexion results in the occipito-frontal diameter having to pass, which is $4\frac{1}{2}$ inches. The labour is, therefore, more difficult. The forehead fixes against the pubic arch, and by flexion the occiput passes over the perineum. The forehead then slips down and the head is born. The movements therefore are (1) Partial Flexion with Descent, (2) Rotation of Forehead to the Front, (3) Flexion, (4) Restitution, (5) External Rotation.

The mechanism of brow presentations. The brow may be changed by flexion or extension to vertex or face before fixation. If neither flexion nor extension occur, the passage of the head in most cases is impossible. In a roomy pelvis it will pass as a brow. The movements are (1) Descent without Flexion or Extension, (2) Rotation of Occiput to the Front, (3) Birth of Head as a Brow, (4) Restitution, (5) External Rotation.

The mechanism of face presentations. The commonest

cause of face is flattened pelvis, in which case the head enters the pelvic canal in the transverse diameter of the brim, for this is the longest diameter. The back of the head is wider than the front. When it is pushed down through the flattened inlet, the narrower anterior part of the head passes more easily than the broader posterior part. Extension therefore takes place. The chin becomes the most advanced part of the foetus, and is pushed by the muscles of the pelvic floor to the front. It passes out under the
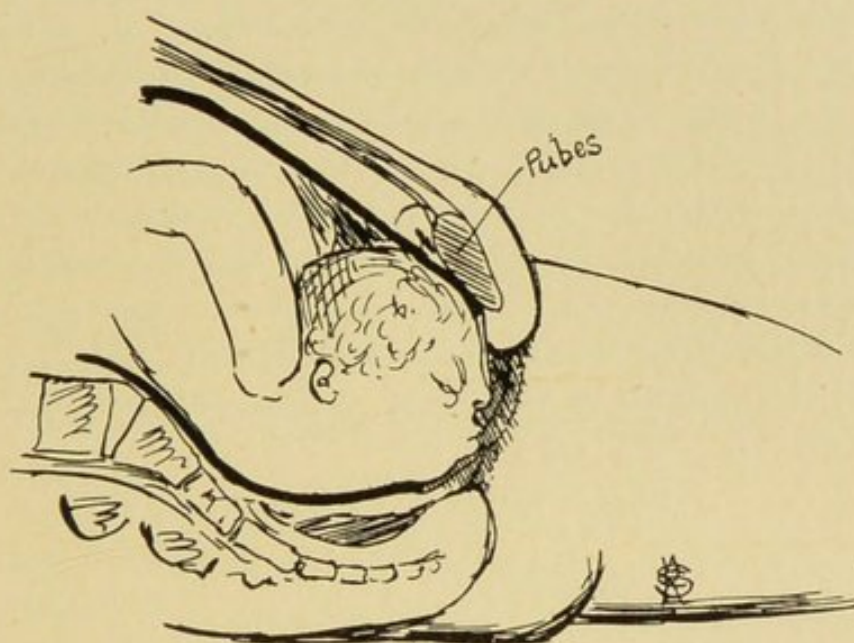
FIG. 87. Impacted face.

pubic arch and the occiput sweeps over the perineum by flexion. The movements are (1) Extension with Descent, (2) Rotation of Chin to the Front, (3) Flexion, (4) Restitution, (5) External Rotation.

Sometimes extension is not complete. The foetal forehead is then lower than the chin, and is pushed, in accordance with the rule, to the front. The chin points backwards. The neck and upper chest descend into the pelvic cavity and further progress becomes impossible without artificial aid.

The mechanism of the after-coming head of breech presentations. In nearly all cases the occiput is to the front, and the movements are (1) Flexion with Descent, (2) Rotation of Occiput to the Front, (3) Maintained Flexion.

When the forehead is in front and persists so, the movements are (1) Partial Flexion with Descent, (2) Rotation of Forehead to the Front, (3) Maintained Flexion.

In rare cases the chin becomes caught at the top of the pubic bone and the head extends. The chin is fixed against the pubes, the occiput sweeps over the perineum, followed by the vertex and the head is born with the face looking upwards.

Transverse presentations. Children that present transversely are not born without help, with rare exceptions. These exceptions are either when the contractions of the uterus turn the presentation into one of head or breech, or when the child, being dead or premature, is expelled doubled up (corpore conduplicato), or by the Spontaneous Evolution of Douglas, in which one arm prolapses, the shoulder fixes under the pubes, the other shoulder, the trunk and legs sweep over the perineum, and the after-coming head is delivered as in breech. But these cases are so rare, that from a practical point of view there is no mechanism to transverse presentations.

CHAPTER X

ABNORMALITIES CONNECTED WITH THE CHILD OR THE PRESENTATION OF THE CHILD

Occipito-posterior Presentations — Brow, Face, Breech, Transverse Presentations — Twins — Hydrocephalus, Anencephalus, Spina Bifida, Meningocele, Monsters— Foetuses of abnormal size—Impacted Shoulders—Prolapse of a Limb with the Head—Prolapse of the Cord.

THE conduction of abnormal labour will be given in four sections :—

1. Abnormalities connected with the child or the presentation of the child.
2. Abnormalities connected with the uterus.
3. Abnormalities connected with the pelvis.
4. Abnormalities connected with the third stage of labour.

OCCIPITO-POSTERIOR PRESENTATIONS

Frequency. Of the 5,630 deliveries, excluding abortions, in the Rotunda Hospital during the last three years, we have had 39 cases of persistent occipito-posterior, or 1 in 144.

Cause. Two conditions are frequently associated with occipito-posterior presentations, namely, feeble uterine pains and damaged levator ani muscles, from torn perineums or vaginal lacerations due to previous labours. The feeble pains produce insufficient flexion of the head, and the damaged levator ani fails to push the occiput to the front in Vertex III and IV, even if it is the lowest part of the foetus.

Course. In most cases of Vertex III or IV good contractions of the uterus push the child's head down, and with descent there is flexion. The occiput is then the most

advanced part of the foetus and gets pushed by the muscles of the pelvic floor to the front. The delivery is then the same as in Vertex I and II.

But, if the pains are feeble, only partial flexion results. The front part of the head is then as low or lower than the occiput and is pushed to the front, or a damaged levator ani and the feeble pains fail to result in any anterior rotation at all. We then get a permanent occipito-posterior presentation, and the head maintains its position when on the perineum and pelvic floor. Three things may happen. (1) The patient may be sent to sleep, good pains come on when she wakes, and the child is born either with or without rotation of the occiput to the front, (2) the feeble pains push the head, with the occiput posterior, through the vulva, (3) artificial aid is needed to effect delivery.

Diagnosis. By abdominal palpation, it is not hard, as a rule, to diagnose occipito-posterior positions. The breech is felt at the fundus, but, on tracing the breech downwards, instead of feeling the back your fingers dip into a hollow between the breech at the fundus and the head at the brim, and in this hollow you feel the knobs of the limbs. You often feel the partial outline of the back along one flank. By Pawlik's grip you feel the head in the brim. You find, owing to the partial flexion, that you feel the occiput and forehead with equal ease. The characteristics of an occipito-posterior presentation then are the breech in the fundus, the head fixed in the pelvic brim, and a hollow between the two in which the outline of the limbs can be felt. You cannot hear the foetal heart as distinctly as in Vertex I and II. If the head has descended deep into the pelvis you use the fourth grip to detect it.

Vaginal examination. We do not necessarily make a vaginal examination in these cases. But the diagnosis by vaginal examination is easy. You pass one or two fingers into the vagina and feel the vertex. You then detect the sagittal suture running in the line of one or other oblique diameter. Near the sacrum, passing your fingers along this suture, you feel the posterior fontanelle, the meeting-place of three sutures. At the other end of the sagittal suture, near the pubes, you feel the anterior fontanelle, the meeting-place

of four sutures. The anterior fontanelle and posterior fon-
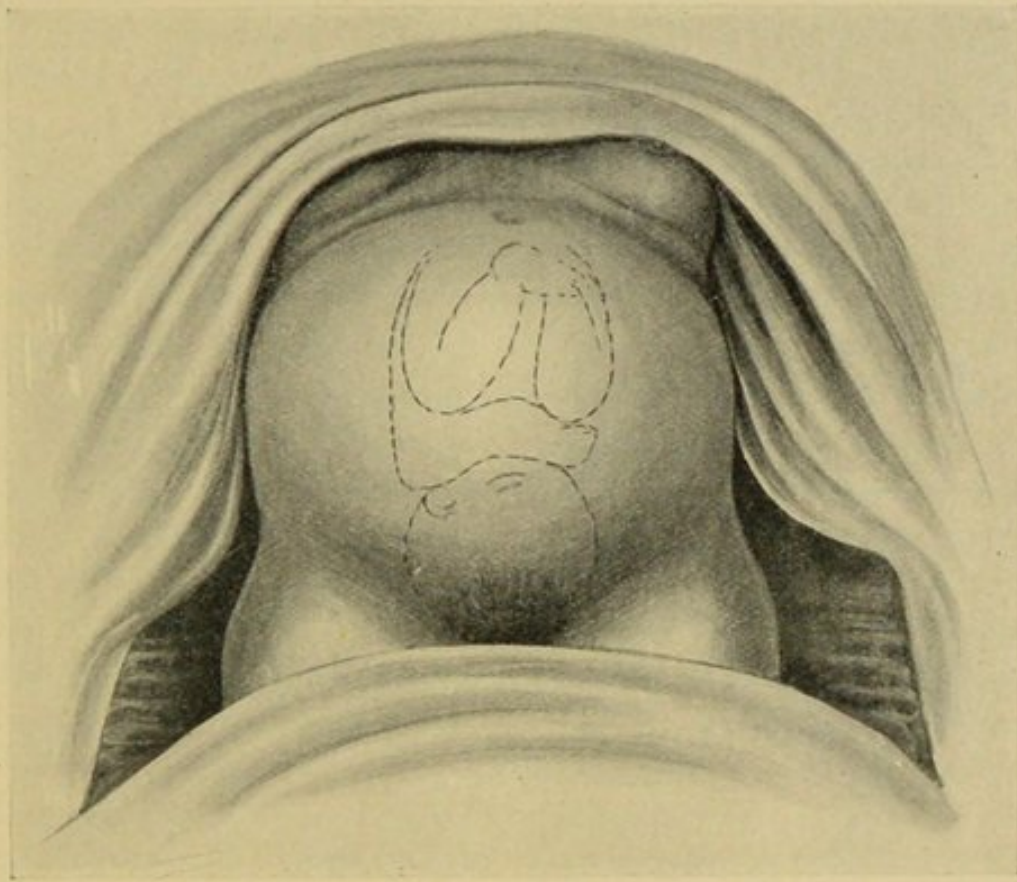tanelle can always be felt in these cases, when the head is

FIG. 88. Vertex III as felt by abdominal palpation.

fixed and the os sufficiently open. If the posterior fontanelle
is behind and to the right, the diagnosis is Vertex III; if behind
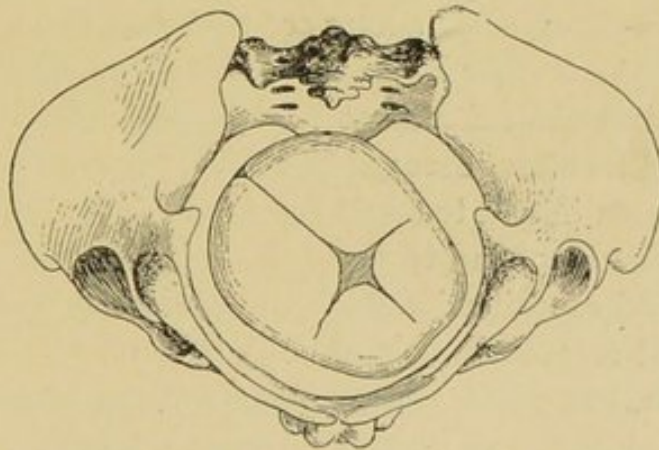and to the left, Vertex IV.

FIG. 89. Vertex IV as felt by vaginal examination.

There is another feature that will impress you, when you make a vaginal examination, and will sometimes first cause the suspicion of occipito-posterior to arise in your mind, namely, that the presenting head seems crowded to the front against the pubic arch and there is plenty of space between the head and sacrum.

Treatment. With the os fully dilated and the membranes ruptured, we do not attempt to turn the occiput to the front, either by twisting with the whole hand in the vagina or putting on forceps and twisting the child's head with them. We pay attention to the common cause of failure of flexion, namely, uterine inertia. If there is no uterine inertia, and the head is advancing with the pains, we leave the case alone. But in other cases, unless the mother has constitutional symptoms, such as pulse and temperature up to or above 100, or there are signs that the child is in distress, we give the mother a sleeping draught such as Chloral Hydrate gr. xx with Tr. opii ♏xx in water, or Morphia gr. $\frac{1}{4}$ hypodermically, and leave her when she falls asleep, telling the nurse to send for us as soon as she wakes up. Frequently when she awakes, she is refreshed and the pains are strong. The occiput will then rotate to the front and the child be born. It is surprising how low the head may be and yet rotation eventually take place. Pressure on the fundus with the pains materially assists. The child is then born, whilst the uterus is in a good state of contraction and not in a condition of inertia. Retraction and contraction occur properly, and greatly diminish any risk of post-partum haemorrhage. If, when the patient wakes, pains are still feeble, or if, after a long second stage, the temperature and pulse of the mother begin to rise or the child shows signs of distress, then the child must be delivered by forceps.

Special points about forceps in occipito-posterior presentations. It is not difficult to apply forceps in these cases, nor have we found that they tend to slip. But, before applying them, make a careful examination with the half hand in the vagina.

If the head rotates during pulling, take off the forceps and reapply them, but when reapplying them get an assistant to press the head down in its rotated position, otherwise it slips back to its original position.

If it does not rotate, it does not matter much. Pull the head out slowly, and carefully making the occiput sweep over the perineum, by first pulling the occiput down and back until the perineum is stretched over it and then pulling more forwards and eventually directly forwards. The perineum is, of course, more likely to be torn owing to the large section, with the occipito-frontal diameter of $4\frac{1}{2}$ inches, that has to pass the outlet.

BROW

Frequency. In the 5,630 deliveries there have been 9 brows, or 1 in 614.

Nature. In occipito-posterior presentations flexion is not complete. In brow presentations the foetal head is neither flexed nor extended, it is in a condition of balance between the two. It commonly becomes a face presentation, but sometimes a brow presentation persists as such. It is the rarest and most unfavourable of all vertex presentations. A section with the mento-vertical diameter $5\frac{1}{4}$ inches, the largest of all foetal head diameters, has to pass. Hence, except in cases where the pelvis is very roomy, or the foetus very small, you will always have to interfere in cases of brow presentation.

Causes. As brow may be regarded as half way to a face presentation and not infrequently becomes a face, the causes of brow are similar to those of face. They are in short anything that prevents complete flexion of the head and thus overcomes the lever and slope actions that produce flexion of the head. They are—

1. The cord round the neck will sometimes prevent full flexion and favour extension.

2. A tumour of the neck acts similarly.

3. A dolicho-cephalic skull, which is longer behind than in front, reverses the normal lever action, which produces flexion.

None of these three are common causes and none of them have any practical importance, for they cannot be diagnosed in time to prevent a brow or face.

More frequent and practically important causes are—

4. Obliquity of the uterus, either lateral or pendulous belly. Owing to the slope of the uterus either the back of the head or the face of the child lies over the pelvic brim, according as the foetus looks away from the deflected uterus or towards it. If the face lies over the pelvic inlet, the contracting uterus tends to push it down into the brim. A lesser degree of this will produce a brow.
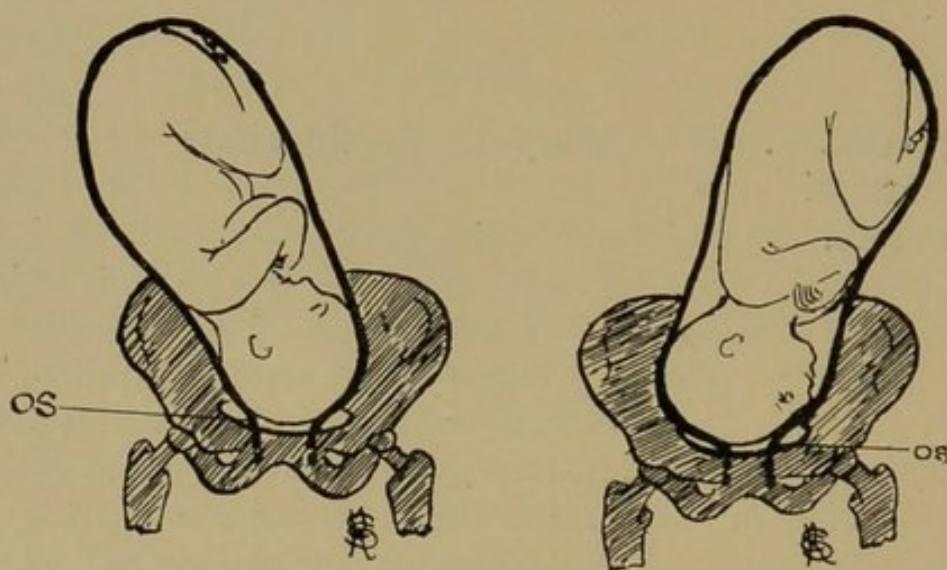
FIG. 90. Effect of obliquity of the uterus in producing extension.

5. Flattened pelvis. In flattened pelvis, the transverse diameter of the brim is the longest. The sagittal suture, which corresponds to the longest diameter of the foetal head, consequently also lies transversely. The head has to squeeze through this flattened pelvic inlet. The back of the head is wider than the front, and hence the front advances more readily than the back, and a face or a brow results.

Diagnosis. You may sometimes be able to diagnose brow by abdominal palpation, but you should always confirm your diagnosis by a vaginal examination.

Abdominal palpation. By the fundal and umbilical grips you find the breech at the fundus and the direction of the back and limbs. You will also, perhaps, notice that the uterus does not look normal, but is bigger and bulged to one side. Not that you can diagnose by what you see, but your suspicions that something is wrong may be aroused by what

you see, and make you ask yourself, Is this case possibly a brow, face, twins, &c. ? thus awakening in your mind the signs of these different lies.

Pawlik's grip is the one that gives you most information. The head does not fit into the brim, therefore you will find a large head, which you can move from side to side, when the uterus is not contracting. This alone will tell you something is wrong, for if the woman is in labour, the head should normally be held by the lower uterine segment and you should not be able to make it ballotte between the pains. You notice the head is mostly above the brim, it has scarcely sunk at all, in fact, you may feel the head by Pawlik's grip as high up as half way between the pubes and umbilicus. Again, you may detect the absence of flexion or extension by being able to feel the head equally well and on the same level on both sides. You may suspect you feel the sharp chin; and the great width between your fingers and thumb when grasping the upper limit of the head, before they sink into the groove of the neck, make you think the case is probably one of brow. But in all abdominal palpations the ease with which you feel depends largely on your practice, on the state of the patient's abdominal wall, and on her nervousness. If, as in rare cases of big pelvis, the head is fixed and descended, even though the case is one of brow, you need not be anxious.

Vaginal examination. Make your vaginal examination first with two fingers and during a pain. The head is not held by the lower uterine segment and therefore the fore-waters and afterwaters communicate. The consequence of this is that the extra weight of the waters compressed by a uterine contraction make the bag of waters bulge down through the os like a sausage. Be careful not to press on them, for the unsupported membranes are liable to rupture early and easily. *This sausage-shaped bag of membranes is another sign that something is preventing the presenting part from fixing or being grasped by the lower uterine segment.* When the pain has passed off, push two fingers up towards the os and discover how much the cervical canal has opened and been taken up. You now come to the third sign that

the head is not held by the lower uterine segment, namely, that you either cannot reach, or can only just reach the presenting part, and the cervical canal, though to some extent dilated and dilatable, is empty and hangs down like a curtain from the vault of the vagina. These three signs then go together and show that the presenting part is not grasped by the lower uterine segment: (1) ballotting of presenting part, (2) sausage-shaped bag of membranes, (3) difficulty in reaching presenting part per vaginam.
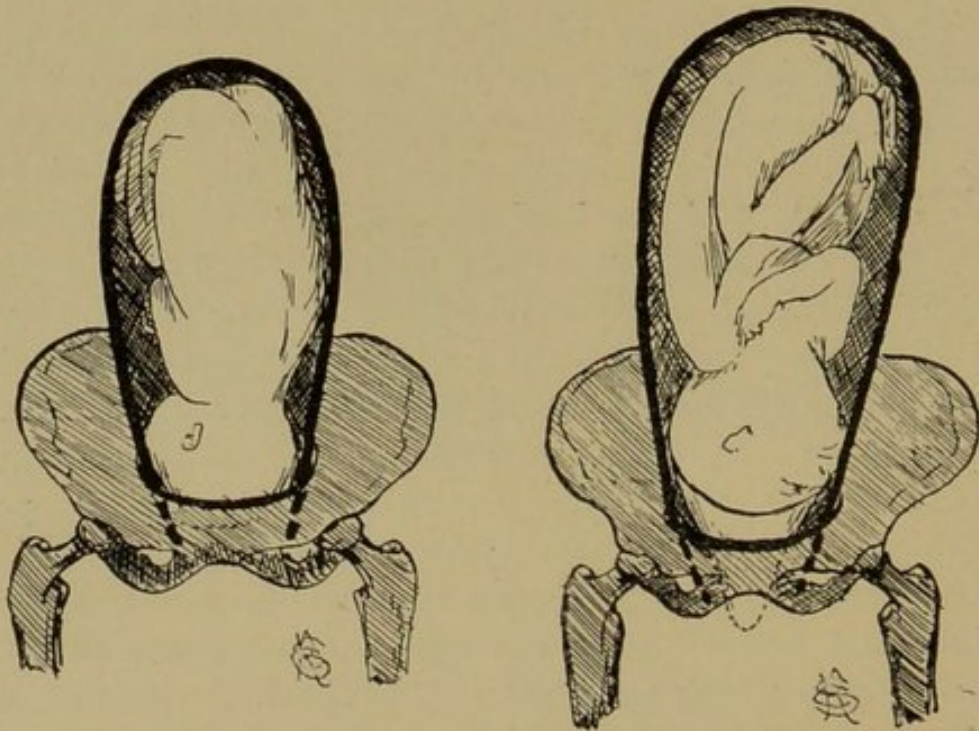
Fig. 91. Diagrams to show bulging membranes due to non-fixation of the head.

You cannot reach the presenting part properly and you want to be sure of your diagnosis, what are you to do? We advise you to lubricate your hand well with soap, washing off the outer and possibly dirty surface of the soap first, and then to pass your whole or half hand into the vagina. You will then be able to reach the head. Examine it only between the pains. The points upon which you make your diagnosis of brow are (1) You locate the anterior fontanelle. (2) You pass your fingers over the nearest part of the foetus, the brow, and feel the bony ridges of the eyebrows and the bridge of the nose. Gather too some information as to the

size of the pelvis, if she is a primipara. (*See* Contracted Pelvis.)

Cases in which the brow has descended into the brim. The brow may be then somewhat masked by a large caput, and very probably the membranes will be ruptured. You can, of course, reach the foetal head easily. By careful and precise examination you locate the anterior fontanelle, the brow, the orbicular ridges, the bridge of the nose, and you press gently over the eyes. During a pain, keep a finger
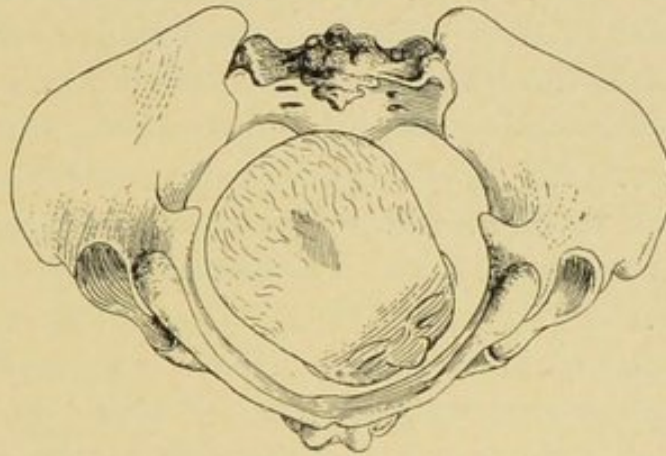
Fig. 92. Brow IV as felt by vaginal examination.

pressed against a bony part of the head, and notice whether the head advances at all with the pain. When the pain has passed, try to push the head up. You will then be able to tell whether the head is tightly and immovably jammed.

Treatment:

You have diagnosed brow by abdominal palpation, and you find the head not fixed, and the membranes unruptured. Try to convert it by external version into a vertex.

Converting a brow to a vertex presentation by external version. Stand by or sit on the edge of the patient's bed as if you were going to undertake the fourth or pelvic abdominal grip. Dip the fingers of one hand between the chin of the foetus and the pelvis, and place the fingers of the other hand over the occiput. Pull the chin up with the first hand, and press the occiput down with the other. If you succeed in flexing the head, push it into the pelvic brim, and keep it in this position while the nurse puts on

a tight binder, pinning it from above down. Then make a vaginal examination to see that the vertex is presenting. You will do no harm if you try this, but it is not often successful.

You diagnose brow with the half or whole hand in the vagina, the membranes are unruptured. You can again try to change the brow into a vertex *if the head is not fixed.* To do so, put the patient in the cross-bed position, and between the pains with your vaginal fingers press the forehead upwards, and with your other hand on the abdomen, press the occiput down. If you succeed, keep the head in position whilst the nurse puts on a binder, and make sure by a vaginal examination that the vertex presentation is maintained. *If the head is fixed,* again get the patient into the cross-bed position, and try to push up the vertex, and bring down the chin, for a face presentation is much safer than a brow.

The position of the woman. After changing the brow to a vertex, and whilst waiting for the os to dilate, let the patient lie in bed on the opposite side to the obliquity of her uterus. If she has a pendulous belly, put on a tight binder. You tend to overcome the disadvantages of oblique uterus in this way.

If you fail to change the brow, and the membranes are unruptured, wait, keeping the patient in bed, until the membranes are ruptured.

When the membranes rupture, whilst you are waiting, and the head is not fixed. You will always be able to get two fingers through the os, and you need not have the same fear of tearing the sodden os as you should have in placenta praevia. Turn the child by bipolar version between pains. If you can get the whole or half hand without force through the os internum, catch hold of a leg and pull it down between the pains. Tie a piece of gauze round the ankle, and leave the case to nature.

The prognosis both for mother and child is far better with breech than with brow. The case is now one of breech.

You find the membranes ruptured, the os not fully dilated, the head above the brim on your arrival. Everything now

depends on whether the uterus is or is not approaching the condition known as tonic contraction. In this condition the uterus fits tightly round the child, the pains succeed one another with intervals of a minute or less; there is never complete relaxation between the pains in which you can feel the foetal parts. Bandl's ring is prominent, and nearing the umbilicus (remember the rule to pass a catheter before any of these manœuvres and examinations), the mother is in distress from the severe pains, and her temperature and pulse are both raised above normal. Rupture of the uterus is threatening, and you must prevent this. Put her in the cross-bed position, and under chloroform relax the uterus, or, at any rate, lessen the pains. Perforate the child's head, and deliver if it is dead. If not, you can try forceps carefully, or still better, perform pubiotomy. If the condition of tonic contraction is not threatening, turn and bring down a leg between the pains under chloroform. If you fail to do this, wait and see if the child's head moulds to the brim. If it does not, you will have to perforate when signs of tonic contraction arise.

The head is fixed in the brim and advancing with the pains, and neither mother nor child show signs of distress. Leave the case. The head will mould. But wait in the room. Carefully watch the mother's temperature and pulse, and if they rise to 100, you must deliver. Listen between the pains for the foetal heart. If it is under 120, or above 160, or you hear a funic to-and-fro souffle, the child is in distress. If the child kicks violently, if solid meconium comes away, or if there is a large caput succedaneum, the child is in distress.

If the head is fixed, and either mother or child show signs of distress. If the os is sufficiently open to put on forceps, well and good. You must risk a tear. If it is not, dilate it with your fingers under chloroform. Put on forceps and deliver. If you fail to deliver, there are only two alternatives left :—

1 Perforate the child's head because of the danger to the mother.

2. If you are able, do a pubiotomy or symphysiotomy ;

with the chance of saving the child's life, it is the best treatment.

Moulding of the head.   After birth the child's forehead, moulded by delivery, will be found to bulge, whereas the forehead and back of the head are flattened.
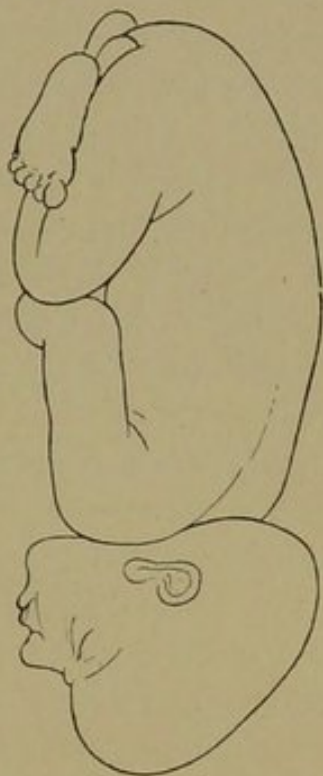
FACE

When the head becomes more extended than a brow, full extension occurs, and a face presentation results.

Frequency.   In 5,630 deliveries we had 8 cases of face, or 1 in 704.

Causes.   The causes of extension leading to face are those that have already been fully described under brow, namely, (1) the cord round the neck, (2) a tumour of the neck, (3) a dolicho-cephalic skull, and commonly, (4) obliquity of the uterus, either lateral or pendulous belly, (5) contracted pelvis.

FIG. 93. Moulding of brow delivery.

Course.   If the chin is to the front or turns to the front, the child is, as a rule, born without difficulty. As this occurs in the great majority of cases, you need not fear face presentations. But with partial extension and the chin posterior, the occiput first reaches the pelvic floor and then turns to the front. The child descends, until the head, neck, and upper part of the chest are in the pelvic cavity, and then jams. Further progress becomes impossible, unless strong pains succeed in increasing the extension, making the chin the most advanced part of the foetus, and so causing it to be turned to the front. If this does not happen, the natural delivery of a living child is impossible, and artificial delivery is very difficult.

Diagnosis.   A face presentation can in most cases be diagnosed by abdominal palpation, and we place great reliance upon it. But the rule to assist diagnosis in all difficult cases by a vaginal examination should be followed.

Abdominal examination. Eefore you examine you may notice that the shape of the uterus does not look normal, and your suspicions may be aroused.

The back is deeply hollowed by extension, and this gives you the clue to palpation by the first and second grips.   You find the breech at the fundus, then if the back is to the front you feel the hollowed back with less ease than the partly flexed back of a normal vertex.   On the other hand, if the
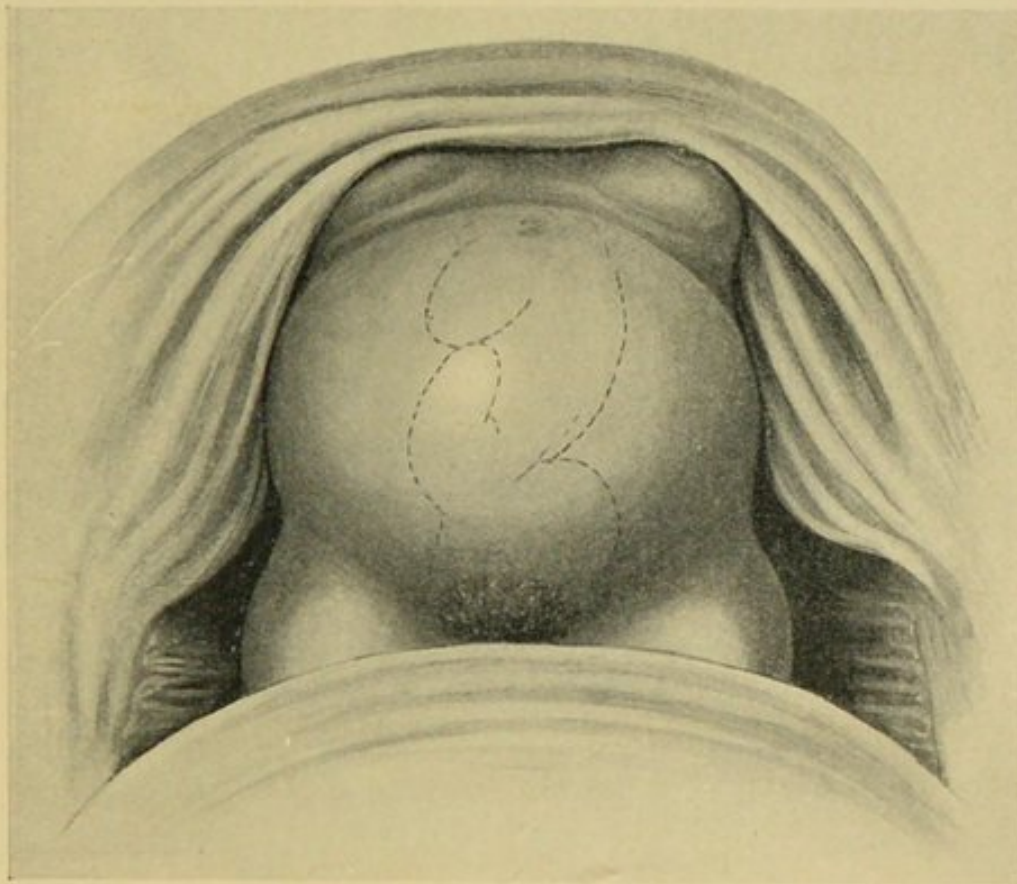
FIG. 94. Face I as felt by abdominal palpation.

back is behind, the chest and limbs are pushed forward against the anterior wall of the uterus, and you feel them with peculiar ease.   In the first case you hear the foetal heart with difficulty, in the second you hear it easily by listening over the foetal chest.

But it is by Pawlik's, or by the fourth, grip that you are most helped in diagnosis.   If the head has not sunk into the pelvis, you feel by Pawlik's grip the prominent occiput as

a round, hard mass on the same side as the back, and the chin
with greater difficulty and at a lower level than the occiput
on the opposite side. You notice that this is the reverse of
a normal vertex, in which by Pawlik's grip the child's forehead
is the more readily felt, and is the higher part of the foetal
skull and on the opposite side to the back. The groove of
the neck also runs obliquely, being higher on the side of the
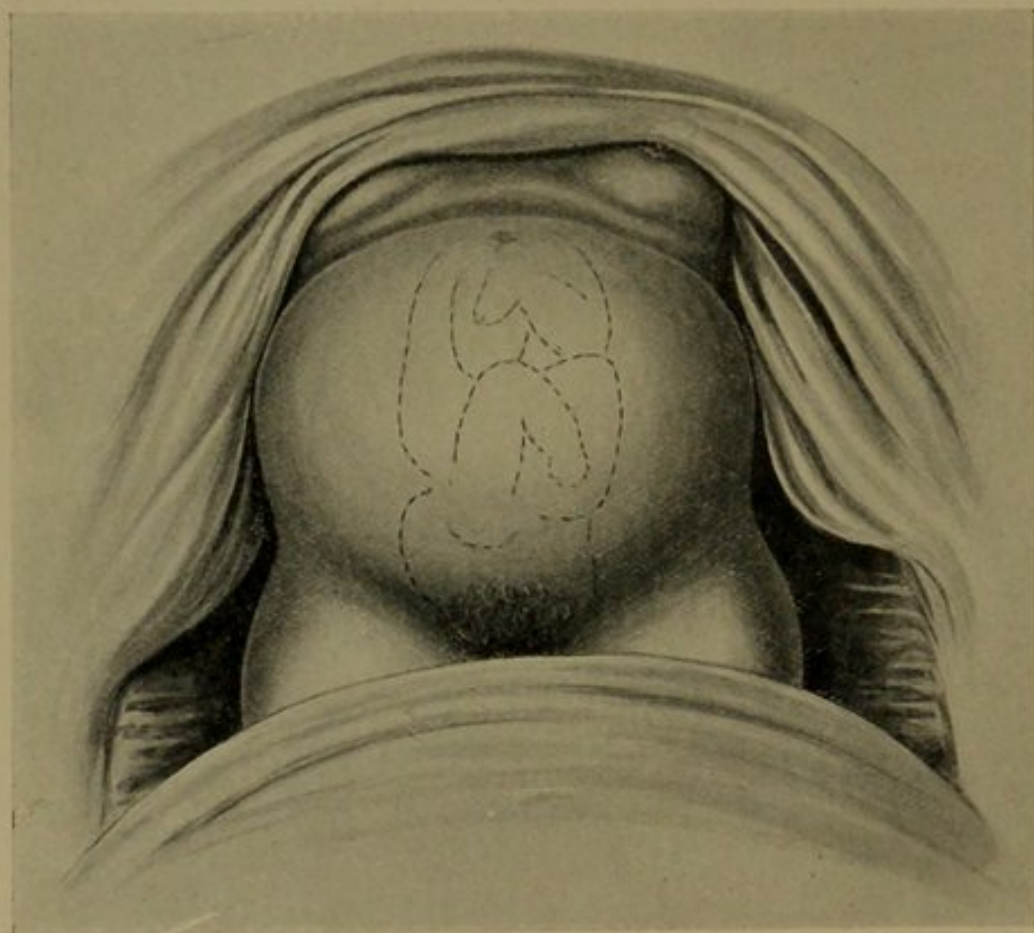
Fig. 95. Face III as felt by abdominal palpation.

back than on the side of the chest, and makes a deep sulcus
between the occiput and back.

If the child's head has sunk into the pelvis, you use the
fourth grip and find your fingers are stopped by the prominent
occiput on the same side as the back, but sink easily into the
pelvis on the side of the child's neck and chin.

Vaginal examination. If the head is not grasped by the
lower uterine segment, you find, with two fingers in the
vagina, the empty cervical canal and the sausage-shaped bag

of membranes, not forgetting their tendency to early rupture. In such a case, if you want to be quite sure of the diagnosis, you will have to pass your whole or half hand into the vagina. You should at the same time, in a primipara or a multipara
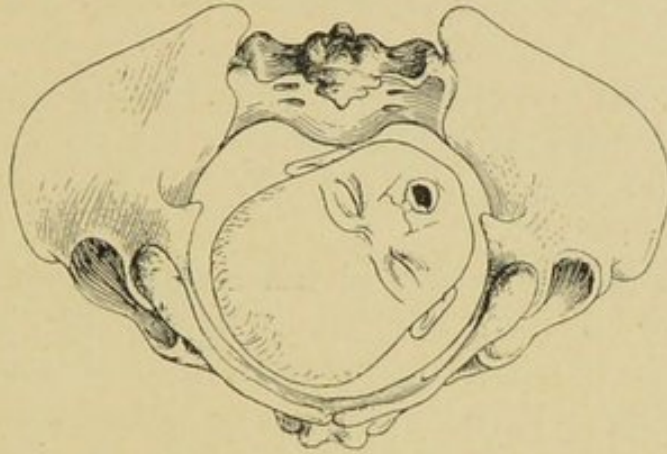
FIG. 96. Face I as felt by vaginal examination.

with a history of difficult labours, discover whether the case will have to be treated as one of contracted pelvis.

When the face has descended into the pelvis, you will at first be very confused by what you feel. The face is obscured by a large caput. You may think you are dealing with

FIG. 97. Face III as felt by vaginal examination.

a monstrosity, but practically this would not matter, if the monster was descending with the pains. You may think of breech, but of one thing you are sure, that it is not a vertex.

To distinguish a face, between the pains put one finger carefully into the child's mouth and feel the ridges of the gums.

You may feel the tongue also. If the membranes have ruptured, you can feel more boldly. The ridges of the gums and the tongue are quite convincing. It is said to be necessary to distinguish an anus, and this you can do by the fact that your finger is gripped by the sphincter ani, but is not by the lips. Also meconium may stain your finger. The lips may make a slight sucking movement, but we do not think this matters, for the chest is too tightly squeezed for the child to suck any mucus into its lungs.

Treatment :

The head is not fixed and the membranes unruptured. You can try to turn the face into a vertex by Schatz's method. But the large majority of face presentations are born without difficulty; you may by Schatz's method only succeed in turning a face into a brow, and so make matters worse; and anyhow you will not alter the conditions that caused the face, so even if you do succeed, face is very apt to recur. We describe Schatz's method, and you will, as a rule, do little harm by trying it. Moreover, we have several times successfully converted a face to a vertex by its means.

Schatz's method. You stand by, or sit on, the side of the bed as for the fourth grip of abdominal palpation. You first lift the head out of the brim, with your fingers dipped down on either side between the head and the pelvis. Then press the prominent chest of the child upwards and towards the back so that, by pressing the chest in, you press the back out, and so flex the hollowed back. With the fingers of the other hand press the occiput downwards and towards the middle line. When you have pressed the chest well in, press on the breech with one hand, keeping pressure on the chest with the other. If you have succeeded in partly flexing the spinal column, pressure on the breech will increase this flexion, and this will also make the head flex. If you have not succeeded, pressure on the breech will make the chest bulge forwards again. The best position of the child for this method is with the back looking to one side and the chest to the other. If the back is behind, you must try and turn the child, so that the back comes more forward before you try Schatz's method.

If Schatz's method succeeds, you will be able to push the well-flexed head into the brim. Then put on a tight binder to keep the child in this position.

If you fail, let the case alone. Unless the case is one of a pelvis too small for the face to descend, *it will descend and*
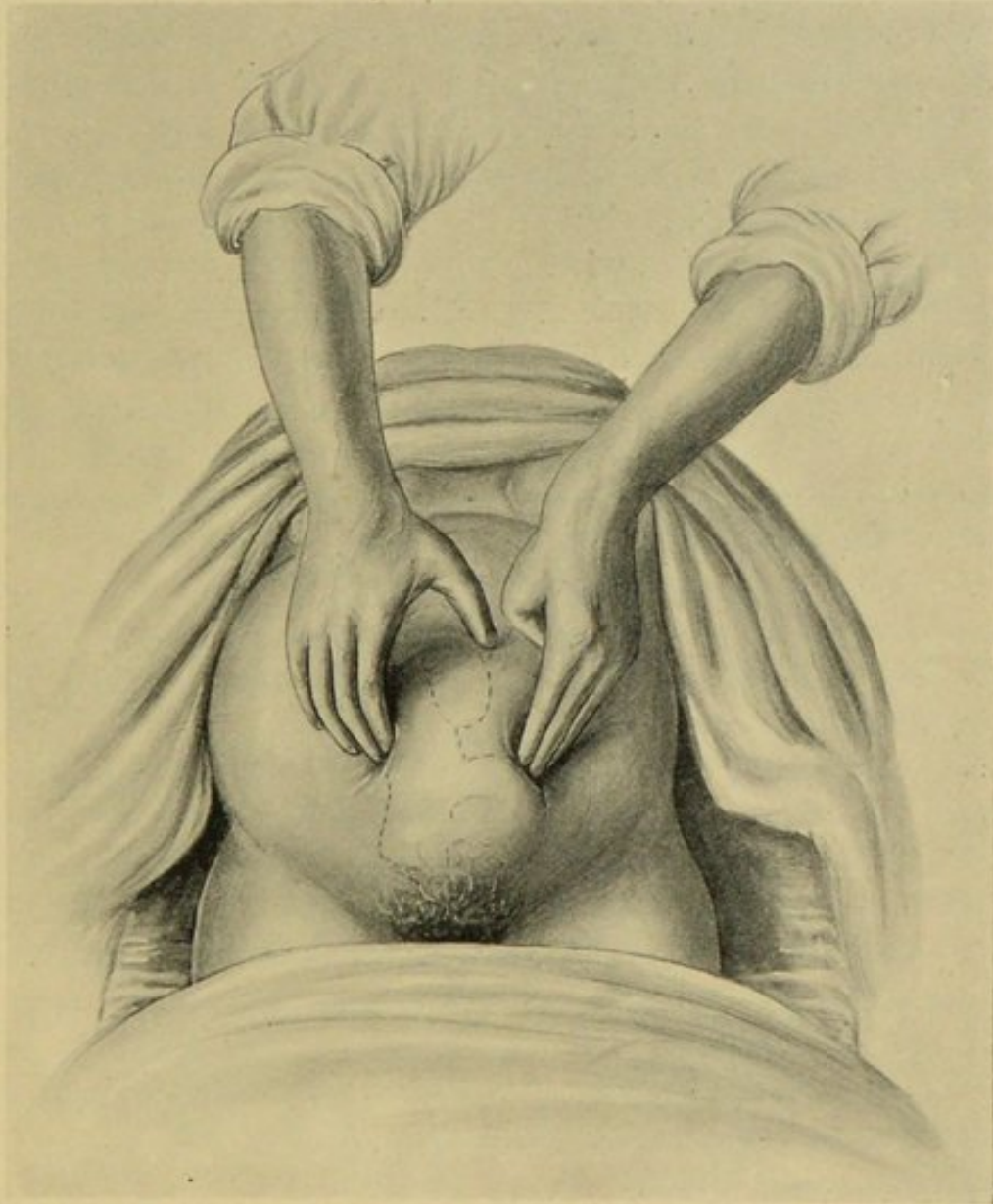

Fig. 98. Schatz's method of converting a face to a vertex.

dilate the os, after the membranes have ruptured. If the face fails to descend and the head can be ballotted above the brim after rupture of the membranes, the case is from a practical point not one of face presentation but rather a case of contracted pelvis.

TWEEDY   P

The face descends into the pelvis, the os is open, and the membranes have ruptured. Leave the case alone. If the chin is to the front, the child will be born naturally; if behind, it will in most cases rotate to the front. Should the chin be in front, and the second stage has lasted two hours, you can put on forceps and deliver.

The chin is behind and does not rotate to the front. The treatment then depends on whether constitutional symptoms arise in the mother or if there are signs of foetal distress.

Constitutional signs and foetal distress signs are absent. If the reason that the chin does not rotate to the front seems to be partial extension with feeble pains, we give our patient morphia (gr. $\frac{1}{4}$) hypodermically, or tinct. opii ($\mathfrak{m}$ xx) with chloral hydrate (gr. xx). When she is asleep, we leave her, and go to her again when she awakes. The pains are often stronger when she wakes, and the stronger contractions increase the extension of the head, the chin becomes the most advanced part of the foetus and turns to the front.

As long as constitutional symptoms do not arise, we continue to wait for this. We have waited as long as eight hours, and then have found a single pain bring about the desired rotation with delivery of the child, when the head was even on the perineum. You will hasten matters, however, if you are able to turn the child's chin forward. Put the patient in the cross-bed, and your whole hand in the vagina, and put your fingers along the most posterior side of the child's chin. Push the chin to the front by the shortest route, either at the beginning of a pain or between the pains. At the same time get the nurse to put her hand on the abdomen over the anterior shoulder of the child and press it outwards and backwards. When the chin is to the front, put on forceps and deliver.

When constitutional signs arise. But if you fail to do this, and the mother's pulse and temperature are rising, and the contractions of the uterus are tending to become tonic, what are you to do? The foetus is probably dead. Listen carefully for the foetal heart. If you have heard it before and cannot hear it now, or if rupture of the uterus is threatening, perforate the child's head through the forehead and

deliver. If the child is alive, we would try pubiotomy, which has been successfully done by others in these cases.

We never turn for face, unless the contraction of the pelvis commends turning, for *nearly all face presentations that descend into the pelvis, are delivered without difficulty.*

When the child's head is born, the lips, eyes, and cheeks are swollen and blue from pressure, and the head and forehead are flattened. The child pre-

Fig. 99. Moulding and caput of face delivery.

sents a very hideous appearance, which passes off in a few days. The shape of the skull alters more slowly.

BREECH

Breech presentations are divided into Complete and Incomplete Breech.

Complete Breech. The buttocks present. The lower limbs are extended along the child's body.
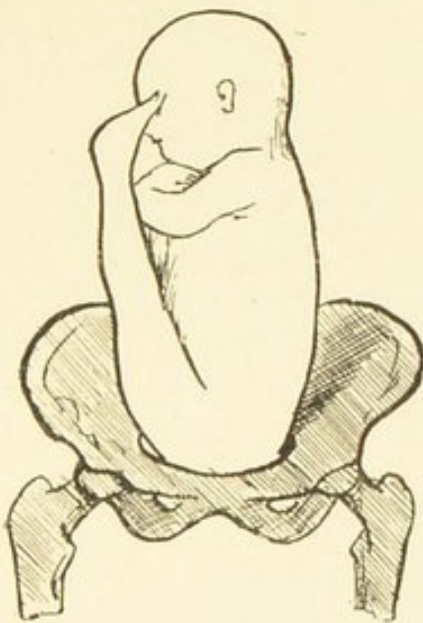

Fig. 100. Complete breech.

Fig. 101. Incomplete breech.

Incomplete breech. The thighs are flexed on the body, and the legs flexed, or one or both legs present (footling).

Practically it matters very little whether a breech is complete or incomplete.

Frequency. In 5,630 deliveries we have had 142 breech or footlings, that is, 1 in 39.

Causes. Breech is not an accidental presentation, but arises from some abnormality of the uterus, pelvis, or foetus, which prevents the normal adaptation of the vertex to the lower uterine segment. Thus—

1. The large head of hydrocephalus does not fit the lower uterine segment so well as normal, and breech presentations are liable to occur.

2. Flattened pelvis prevents the vertex reaching the lower uterine segment, and breech presentations are liable to occur.

3. Excess of liquor amnii causes the child to float, the vertex does not fix, and breech is more commonly found than normally.

4. Twins alter the shape of the uterus, and breech is one of the malpresentations that may result.

5. Placenta praevia alters the lower uterine segment and renders breech presentations more liable to occur.

6. Premature or dead children tend to malpresent, and with them breech is more common than normal.

7. In many cases a discoverable cause is not present.

An important cause in a primipara is contracted pelvis. If you find a breech in a primipara, you must make up your mind whether the case is one of contracted pelvis.

You may also take it as a general rule, that, in the event of breech presenting, there are conditions present which make this presentation the best for the mother, and we think that it is better to have a breech presentation, rather than attempt to turn it by external version to a vertex presentation.

Danger of breech presentations. The danger to the mother is not greater than that of a normal vertex. Rapid delivery of the child's head sometimes causes bad lacerations of the perineum. But the danger to the child's life is considerable, especially when breech occurs in a primipara, or skilled assistance is not at hand. The child dies either because

the cord is pressed on and its circulation stopped by the after-coming head, or because it takes an inspiration whilst the head is still in the pelvic cavity and sucks mucus and liquor amnii into its lungs.

Course. The breech does not fit the lower uterine segment so well as the head, hence the membranes protrude in a sausage-shaped manner and are apt to rupture early. The os then takes some time to dilate, for the breech does not press open the os so well as the hard head. The rest of the course of breech is so intimately connected with treatment, that the two will be described together.

Diagnosis. The diagnosis of breech can frequently be made by abdominal palpation alone. Meconium coming away after rupture of the membranes makes you suspect breech, but meconium comes away under other conditions. You hear the heart often best at the level of the umbilicus, that is to say, higher than normal during the first stages of labour.

Abdominal palpation. You find, by the first grip, the head and not the breech is at the fundus. You distinguish the head from the breech by the fact that the head is separated from the back by the sulcus of the neck. Feel the fundal pole, and run your hand from it down to the back. When the breech is at the fundus there is no groove into which your fingers dip between it and the broad back. When the head is at the fundus there is a groove. Again, the head, forming an independent mass, separated from the back by the neck, can be moved from side to side freely between the pains. You can also move the breech from side to side, but when you move the breech you move the whole back as well. Movement, is, therefore, not so free. Whilst ballotting the part of the foetus in the fundus with one hand, feel the back with the other. You will be able to tell if the movement is imparted to the back or not.

These are the two signs upon which you should rely most in diagnosing that the head and not the breech is in the fundus. The head also feels hard, but in the absence of the other signs, do not rely on this, for the breech may feel quite as hard as the head.

By the second grip, you make your fingers dip into the sulcus of the neck. You may also feel the knees or legs on one side, the back on the other. If you feel the movement of foetal limbs, they give you the clue to the position of the child.

By Pawlik's grip you feel the resistant mass of the breech continuous with the child's back. You miss the prominence of the forehead of a normal vertex.

The fourth grip is hardly necessary, but you make it to be sure that the head is not sunk into the pelvic cavity, or that another head is not sunk into the pelvic cavity, in which case the diagnosis is that twins are present.

The necessity for a vaginal examination. If you are convinced of the diagnosis by abdominal palpation, a vaginal examination is not necessary, except when the waters break, for fear of a prolapsed cord. Although the cord is bound to be prolapsed in advance of the after-coming and compressing *head*, yet the prolonged pressure of the *breech* on a prolapsed cord is better avoided by replacing it. In many cases, although you feel sure the head is in the fundus, you are not quite sure that the breech has engaged. The case may be one of oblique lie. Therefore, unless you feel the back running straight down into the pelvis, make a vaginal examination.

Vaginal examination. Before the breech has been grasped by the lower uterine segment, your two fingers will not reach the presenting part. You may feel that the os is partially open and that the bag of forewaters, not shut off from the after-waters, bulges through the os like a sausage. The cervix is empty and not taken up. These things tell you some abnormality is present, but do not tell you what particular abnormality it is.

What are you now to do?

Pass your whole or half hand lubricated by soap gently into the vagina, and between the pains pass a finger through the cervix. If you fail to diagnose the presenting part, wait until the os is more open. If the os is closed, leave your patient until definite signs of labour begin.

What you feel by vaginal examination. It is not unlikely that sometimes you will mistake a breech for a head, for the breech feels very hard. The groove between the buttocks

resembles a suture, but in a suture you can feel overriding of the bones, and a suture leads to a fontanelle.

We place most reliance on feeling the sacrum and its tubercles
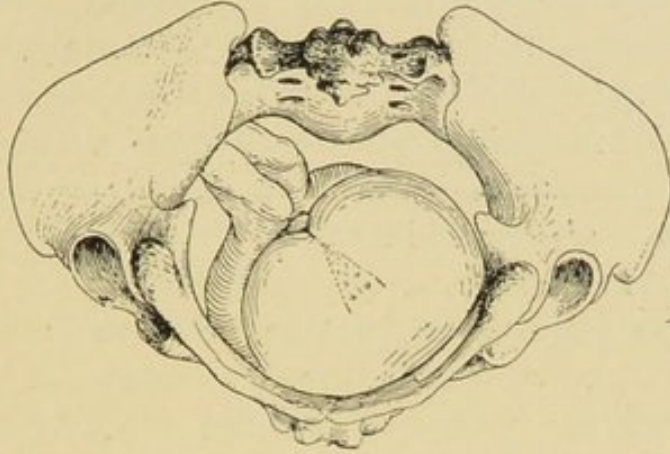
FIG. 102. Breech II as felt by vaginal examination.

leading down to the coccyx. When they are felt you can be sure of breech. Later, when the membranes have ruptured, a large caput may obscure the outline of the breech, but you will still feel by pressing over the sacrum the tubercles, and
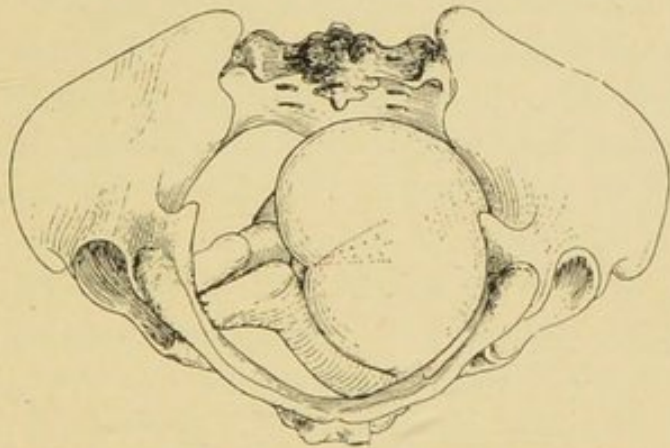
FIG. 103. Breech III as felt by vaginal examination.

you can put one finger into the anus. The sphincter ani grips your finger, and you may get meconium on your finger.

Occasionally a foot presents, and you have to distinguish it from a hand. With two fingers this may be very difficult. The tips of your fingers lightly touch or brush over the foot, and the sensations conveyed by them are not sufficient to give a clear image to the mind. Do not be content with doubt. Pass the half hand into the vagina and you will then be

clear as to whether it is foot or hand. The even level of the five toes differs from the four fingers and outlying thumb. The thumb also has more movement than the great toe, but the greater movement of an infant's great toe, as compared to an adult's, makes this sign a little misleading. The heel, however, is quite distinctive. When the membranes have ruptured, solid meconium comes away freely. This, which is a sign that the child's life is in danger when the head presents, is of no significance in breech.

Treatment :

Before the membranes rupture. Let the patient alone. Keep her in bed, for there is fear of premature rupture of the membranes if she walks about, and then the power the membranes have of dilating the os is lost.

If the unruptured membranes appear at the vulva, rupture them.

The membranes are ruptured. Some recommend you to pull down a foot to avoid the chance of impacted breech. We think this is unnecessary and do not interfere, unless the breech is actually impacted, until the breech is born to the navel. The slow progress of the breech through the vagina is highly desirable, for the vagina thus becomes dilated and the after-coming head will descend with greater ease. A hand or arm may be prolapsed at the side of the breech. This increases the dilatation of the vagina and is an advantage. Never bring down a leg and pull on it, for you are extremely likely to cause extension of the arms by doing so. Then head and extended arms together jam in the pelvic brim. Only when the head is small, as in premature children, is this a good thing to do. The os, which does not dilate fully, tends to catch round the child's neck, and the extended arms prevent this.

When a complete breech appears at the vulva. Put the patient in the cross-bed position. Pass two fingers into the posterior groin of the child and pull down the posterior leg. Then pass two fingers into the anterior groin and hook down the anterior leg.

When the child is born to the umbilicus. The room must be warm with a fire. Cold air on the breech tends to make the child inspire prematurely.

Take a loop of cord and pull it down. At the same time the nurse is ready to press on the fundus.

If the cord is pulsating well, you can wait till the next pain, and, when the pain comes, the nurse presses strongly on the fundus and the child will be born.

If the cord is pulsating slowly, or is not pulsating, the child's head is probably compressing the cord and stopping its circulation. If the circulation through the cord stops for four minutes, the child will certainly die.

You must deliver the child with speed. The child's life depends on the speed and skill with which you deliver.

The first thing is to bring down the arms.

How to bring down the posterior arm. The breech will
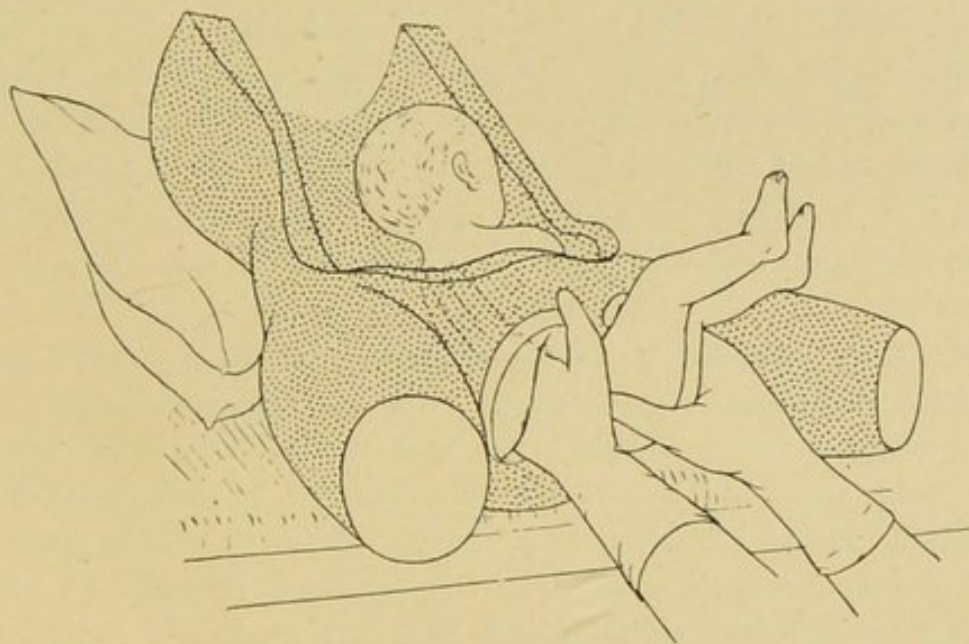
FIG. 104. Bringing down the posterior arm.

be born with one or other trochanter directed forwards. You first bring down the posterior arm. Catch the child round the hips with one hand and lift the breech up towards the mother's abdomen. Pass the whole or half hand lubricated with soap into the vagina along the back of the foetus. If you do not find enough room to do this, push the child's body up into the pelvic cavity and this will give you room. Your hand is along the child's back in the hollow of the sacrum. Pull the child's body down, so as to bring the

posterior arm near to your fingers. Then hook three or four fingers over the child's humerus. Your fingers evenly distribute the pressure over the child's arm and you avoid breaking it. If the arm is extended, sweep it over the child's face, across its chest, and bring the limb out at the vulva. If the child's arm is not fully extended you bring the arm down similarly and with less difficulty.

To get down the anterior arm. Pull the child's body back against the perineum with the hand you had in the vagina. Pass three or four fingers of the other hand between the pubis and the child, hook them over the child's arm and bring it down. If this fails, owing to want of room, make the anterior arm posterior. To do this, pull the prolapsed arm over the child's chest outside the vulva and twist the child round in the direction to which the prolapsed hand points. At the same time catch the child's pelvis with the other hand and twist it in the same direction. The anterior arm becomes posterior and you bring it down as a posterior arm. If you cannot get the child to twist round in this way, sometimes you are able to twist it round in the other direction.

What to do when one of the arms lies in the groove of the neck at the back of the head. This is a serious difficulty. You diagnose it by feeling the arm behind the head, when you pass your half hand into the vagina to pull down the posterior arm. Discover in which direction the hand points, and twist the child's body in the opposite direction. You thus free the arm and bring it down.

Delivery of the head. The child is still in danger and speed still essential.

Pass two fingers of one hand into the vagina and put them in the child's mouth well to the back of the tongue. Support the child's body on this forearm. Put the fingers of the other hand over the child's shoulders from the back. Then pull the child's head down and, when the child's occiput is jammed against the pubic bone, continue to pull the head but lift the child's shoulders and body up towards the mother's abdomen. If the head is not delivered, get the nurse at the same time to press down on the child's head

from the abdomen. We have always succeeded in effecting delivery in this way.

If it fails, you can put on forceps in a similar manner to applying them to the forecoming head, and deliver by
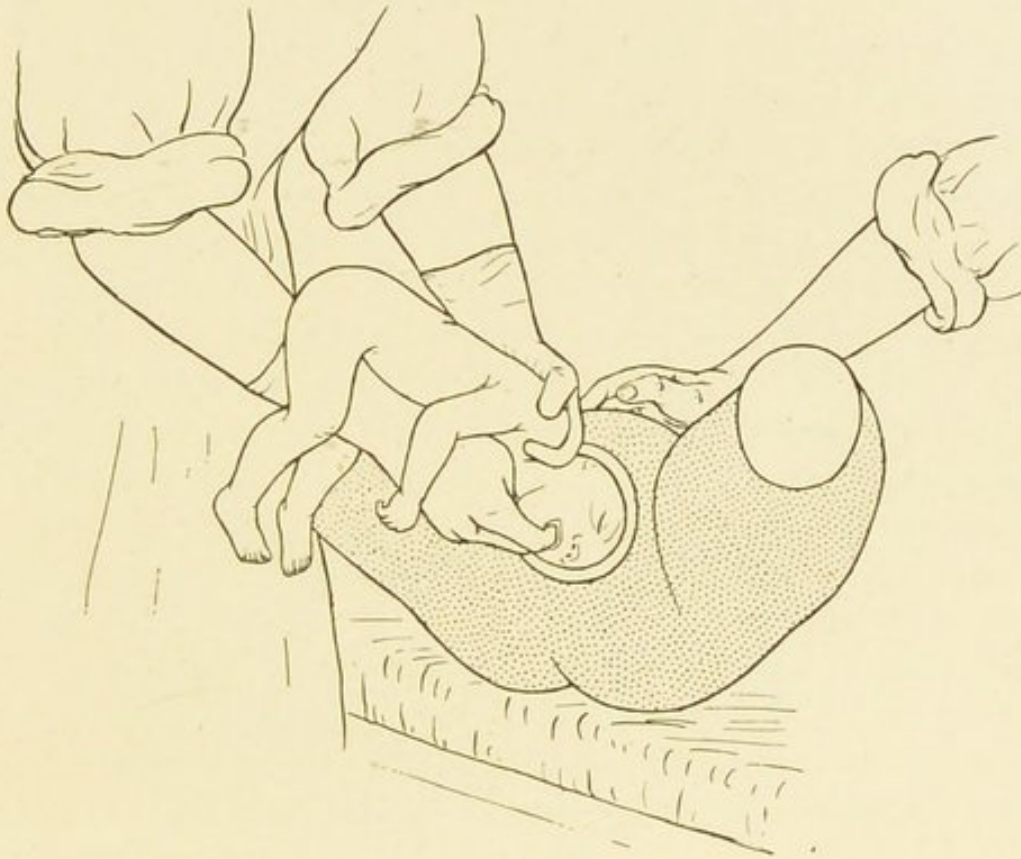
FIG 105. Delivery of the head with fingers in the mouth.

pulling. Many obstetricians always have their forceps ready in cases of breech and deliver the head with them.

A third method of delivery, which is useful, is that known as the *Prague* method. Its value lies chiefly in the fact that you can do it quickly if your hands do not happen to be clean at the time. Take the child's ankles with your right hand. Pull the child's head down as far as possible. Then put the fingers of your left hand on either side over the child's shoulders. Your object is to flex the child's head by lifting the shoulders, which presses the occiput against the pubis, and so maintains and tends to increase flexion of the head. With your fingers hooked over the child's shoulders, lift and

pull them up, and at the same time carry the child's legs up towards the mother's abdomen. Whilst the occiput is fixed against the pubis, the face of the child sweeps over the perineum. You see that the Prague method is much the
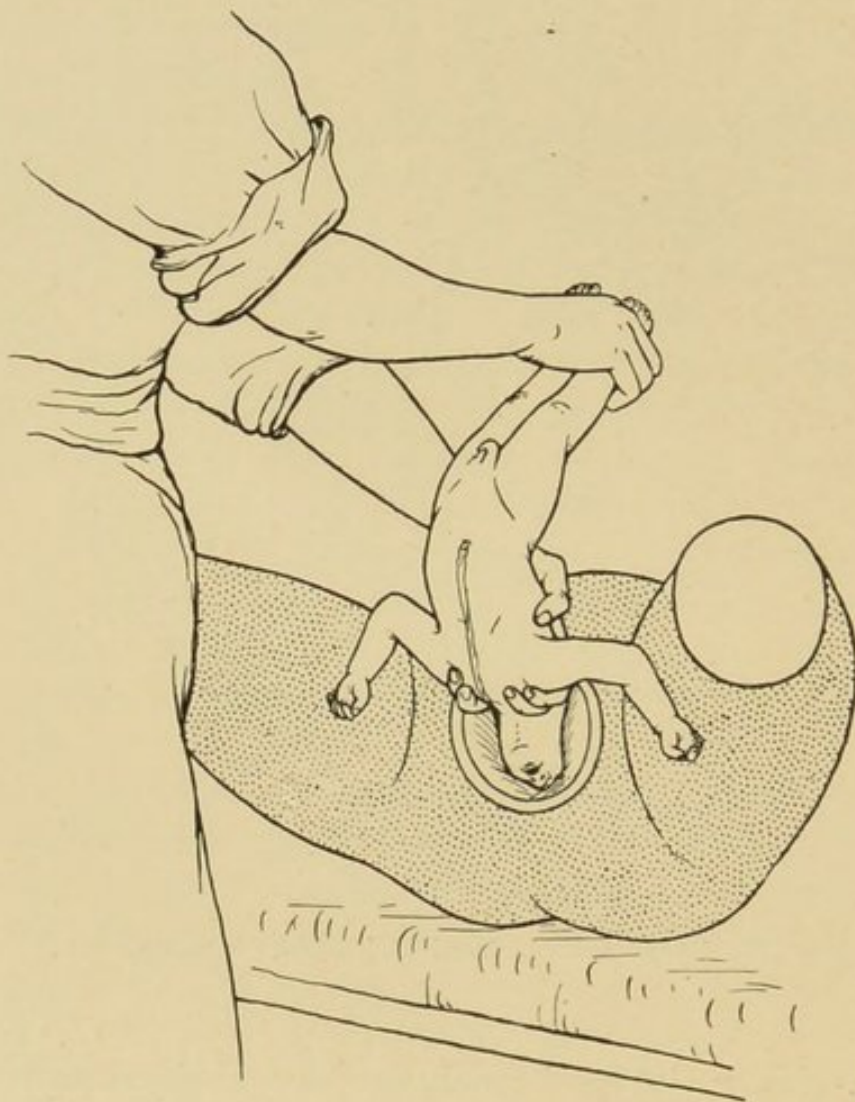
FIG. 106. Delivery of the head by the Prague method.

same as the method already described, only the fingers are not put into the mouth.

In rare cases the head has had to be perforated, either through the roof of the mouth or through the occiput.

If you find the occiput posterior. Twist the child, and the occiput becomes anterior. If you fail in doing this, pass your hand up along the mother's sacrum and then round to the child's face and hook your fingers into the child's mouth.

Pull down the face and then pull down the occiput with your
other fingers over the child's shoulders.

**If the chin is caught on the pubes and extended, or if, owing
to the flattened pelvis, the child's head lies transversely.**
You follow the same tactics. You put two fingers into the
child's mouth and two over the shoulders, and pull. It does
not matter if the head comes down transversely, the occiput
looking to one side of the pelvis and the face to the other.
You can turn the occiput to the front or it will turn during
descent, and deliver as before described. If these methods
fail, first try forceps, and finally perforation.

Impacted breech. By impacted breech is meant a com-
plete breech presentation which enters the pelvic brim, but
becomes impacted in the pelvic cavity. The progress of the
breech may be slow, but when it is impacted, a large caput
forms, the foetal heart between the pains begins to beat
above 160 or below 120, the mother's pulse and temperature
begin to rise and the uterus tends to become tonic in con-
traction. The large caput and absence of any advance with
the pains, which you detect by pressing on the breech with
vaginal fingers during a pain, call upon you to help delivery.
An impacted breech has, of course, passed the pelvic inlet.
If labour pains do not drive a breech past the pelvic inlet,
the case is one of contracted pelvis.

Treatment. You can sometimes help the advance by pressing
on the fundus with the pains, but this is seldom sufficient.

Obviously a limb cannot be brought down in true impac-
tion. One simple method of treatment is often effectual.
Hook a finger of one hand over one or other foetal groin.
Grasp the wrist of this hand with your other hand, and
then pull with both arms. Pull with the pains, and at the
same time get the nurse to press on the fundus strongly.
Your finger, however, soon tires. You then should pass
a fillet over one foetal groin.

Passing a fillet. The fillet we use is a long strip of
iodoform gauze about six inches wide. There are two ways
of passing it. Push a piece of gauze with your fingers up
between the child's thighs or outside one thigh, pass it over
the groin and then pull it down with your fingers or forceps.

If there is no room to effect this, you first pass a loop of silk over the groin by means of a catheter. To do this take a No. 12 or No. 14 male catheter. Push a doubled piece of silk up it by the stylet and pull a loop out of the eye of the catheter. Leave the stylet in and bend the end of the catheter to a hook. Pass the bent catheter up between the child's thighs, guiding it by your finger in the vagina. Turn the hook over one or other of the thighs. Now slowly
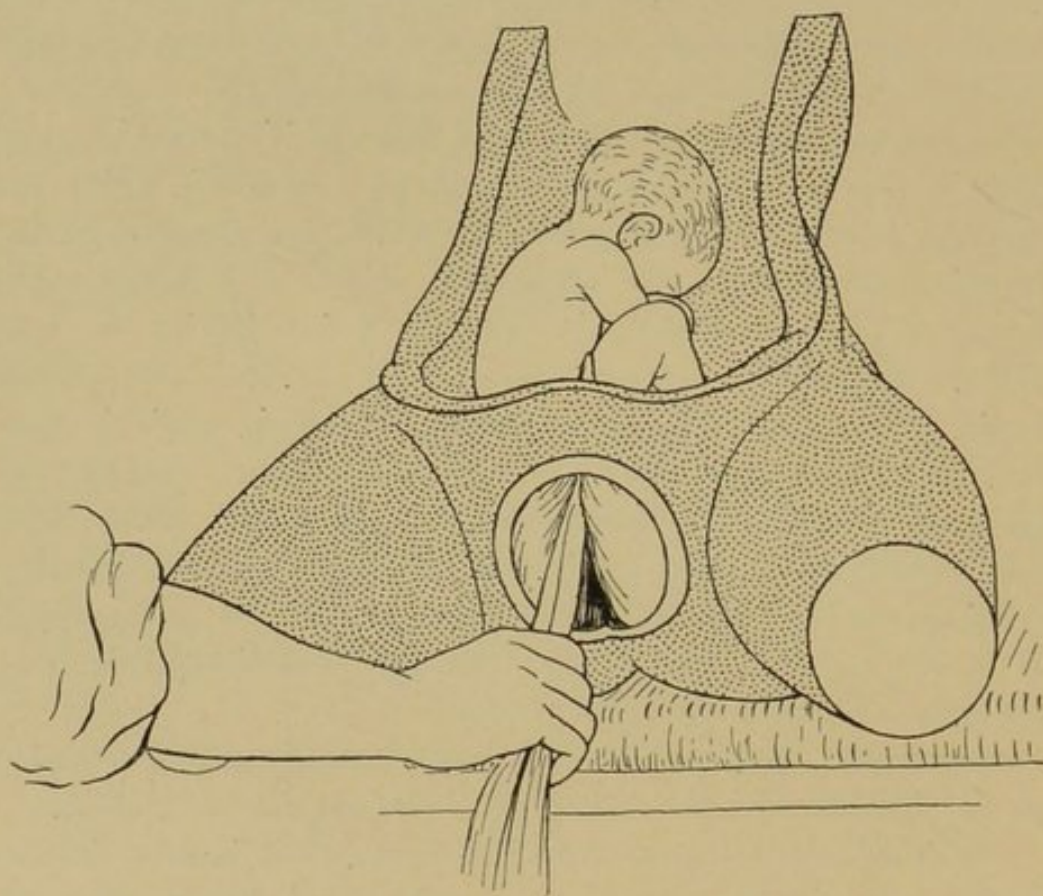
FIG. 107. The fillet in impacted breech.

withdraw the stylet, keeping the catheter in position. Push the catheter further up. The convexity of the curve is in this way pressed against the child's abdomen. The bend increases and the tip of the catheter descends more and more down the outer side of the foetal thigh. Push your fingers up the outer side of the thigh to meet it. Catch it and guide it out of the vulva, still pushing the stem up to allow the tip to progress. Tie a piece of iodoform gauze to the loop of silk and withdraw the catheter.

You now have a piece of gauze passing over the thigh. You next push it well home into the groin. This is essential, for, unless it is well home, when you pull you are extremely liable to break the thigh bone. Pull with the pains, whilst the nurse presses on the fundus. If the fillet is passed over the posterior groin, it becomes the most advanced part of the uterus, and you may see it turned to the front according to rule. Pulling on the fillet with pressure on the fundus will deliver an impacted breech to the navel, and then the treatment becomes one of ordinary breech.

We do not use blunt hooks. They are apt to fracture the thigh and tear the tissues of the groin.

CROSS-BIRTHS OR TRANSVERSE PRESENTATIONS

True transverse lies are rare; more frequently the head is found either in one iliac fossa or to one side of the fundus—the lie is oblique.

Frequency. In 5,630 deliveries we have had 17 cross-births, or 1 in 331.

Causes. 1. An oblique uterus pushes the head into the iliac fossa of the opposite side.

2. Contracted pelvis favours cross-births and other malpresentations.

3. Hydramnios prevents fixation and favours malpresentations.

4. One or both twins may be transverse.

5. Premature or dead children often malpresent.

6. Uterine tumours prevent the normal position of the child.

7. Placenta praevia prevents the head engaging, and a transverse lie may result.

8. The slack uterus of a multipara is less likely to maintain a foetus in its proper position than the firm uterus of a primipara.

Course. The shoulder eventually gets pushed over the internal os and presents. The arm may or may not prolapse. It usually does so; therefore a prolapsed arm and the shoulder in the internal os is practically the presentation

offered by a transverse lie, when the membranes have rup-
tured. Before this shoulder, ribs, back or abdomen may lie
over the internal os. Natural delivery is impossible, except
in the rare cases of dead or premature children, by mechanism
described under the heading of Mechanisms. Unless skilled
help attends the mother, the child will not be delivered and
the mother will die.

Diagnosis. Abdominal palpation and vaginal examination
will be necessary.

Abdominal palpation. By Pawlik's grip you feel no pre-
senting part in the brim and this puts you on your guard.
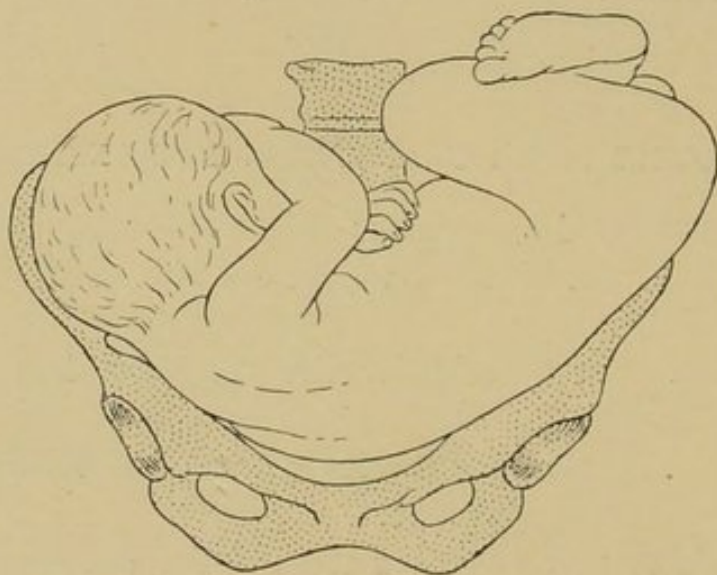
FIG. 108. Transverse II.

By the fourth or pelvic grip you feel that the pelvic canal
is empty.

You now have to locate the head, and this is often more
difficult than discovering its absence from the brim. The
head often lies in one or other iliac fossa, and the abdominal
muscles over it, being sometimes stretched and hard, obscure
its outline. You will find the head either in an iliac fossa
or somewhere near the fundus, more rarely in one or other
loin. You distinguish it in the same way as you distinguish
it in breech presentation, namely, (1) by ballotting it sepa-
rately from the back, (2) by the groove of the neck separating
it from the back, (3) by its hardness and size.

Vaginal examination. Unless the arm is prolapsed, your

two fingers in the vagina cannot feel the presenting part. The unsupported membranes bulge down like a sausage with the pains and are very liable to rupture early. Between the pains, you push a finger into the cervix and find that it is empty and there is no fixed presenting part. In short you get the three warnings that something is wrong. It is very important, if you suspect a cross-birth, to be sure. Therefore put your half or whole hand into the vagina, giving your patient chloroform, if necessary. Upon an exact determination of the lie depends the best success of treatment. But, if with your two fingers in the vagina you found the
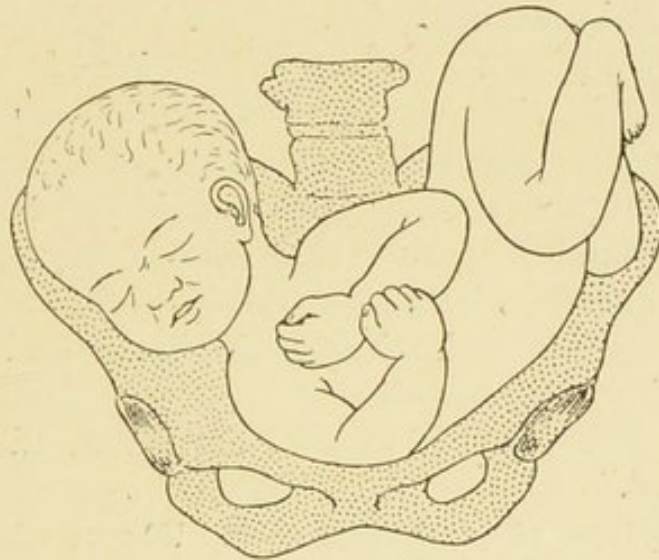
Fig. 109. Transverse III.

os admitted only one finger, and the membranes were unruptured, we advise you not to give chloroform; wait until the os admits two fingers. Then you give chloroform, put the patient in the cross-bed position, and be ready to turn, if you diagnose cross-birth.

Usually the shoulder lies over the os. At first touch you may mistake the shoulder for a sacrum or knee. But you can distinguish it by tracing the outline of the axilla and feeling the acromion process and spine of the scapula. The position of the scapula, whether you feel it anteriorly or posteriorly, tells you the position of the back, and so the lie of the child. You can also usually distinguish the ribs which are characteristic.

Later an arm will often be found to be prolapsed. When the hand is in the vagina, there is no difficulty in distinguishing it from a foot. You can tell which hand it is by taking it as if to shake hands with it, and when you know which hand it is you can reckon out the lie.

The importance of the lie is obvious. If the back is directed downwards and the limbs upwards, it is far more difficult to catch a leg than if the back is up towards the fundus and the limbs in the neighbourhood of the internal os.

Treatment :

Before rupture of the membranes when labour has only just begun. External version on lines similar to those recommended for face are advised by many. We have not found it of any use trying to push the child's head into the pelvic brim. The binder and pads never succeed in keeping it there. But if you can by external version push the breech into the brim, do so, for you can keep the breech in position by a firm binder. The method of doing this depends very much on the particular lie of the child. First, therefore, carefully diagnose the lie. Then push the head up to the fundus and the breech to the brim between the pains.

Always correct any obliquity of the uterus and keep the patient in bed.

Before rupture of the membranes. The os admits one or more fingers. You must ascertain whether the case is one of contracted pelvis, in which case you treat it according to the rules of contracted pelvis. But, if the woman has had live children born, or is a primipara without contraction of the pelvis, you can either wait with the patient until the membranes rupture and then turn, or you rupture the membranes and turn by bipolar version as soon as you get two fingers through the os internum. Your choice depends on the time at your disposal, but you should never leave such a patient without bringing down a leg.

The method of doing bipolar version has already been described under placenta praevia. The preparations and procedure are precisely the same. When you have brought a leg down and tied a strip of gauze round the ankle, you can leave your patient safely in bed under the care of the nurse,

and tell the latter to send for you when the pains begin to force the leg down. There is one great difference in turning in these cases and in placenta praevia. *In placenta praevia the lower uterine segment is sodden; in these cases it is not;* and so you can push first two fingers, then three, and then four through the internal os without the fear of a dangerous tear of the cervix.

If the hand is down, tie a piece of gauze round the wrist before turning, so that you may prevent its extension during the delivery of the after-coming head.

The membranes have ruptured. Treatment then depends on whether all the liquor amnii has drained away and the uterus has contracted down on the foetus and made it immovable.

You put your whole hand into the vagina, with the patient in the cross-bed position and under chloroform. Then you ascertain the size of the os and the mobility of the foetus between the pains. You then decide whether to attempt bipolar or internal version according to the size of the os. In a case where an attempt at version is unsuitable, something like the following will be found. The contraction or Bandl's ring rises up towards the umbilicus and grasps the child so firmly that you cannot get your intra-uterine fingers between the ring and the foetus. Below the ring you feel the uterus large and ballooned, even feeling to you as large as the whole uterine cavity. These conditions warn you not to attempt version, and when less evident not to use force when attempting version.

Other conditions of obstructed labour will also be present. The mother's pulse and temperature are above normal and rising. She is anxious and in pain. The uterus is hard and tender and does not relax between the pains. In extreme cases the mother's pulse is very rapid, her lips and tongue are dry, with sordes on her teeth, and she is evidently in great danger. Rupture of the uterus is threatening. The child will be dead. Listen for the foetal heart or feel for pulsations of the cord. If you still hear the foetal heart, rupture is not so imminent, and with your patient deeply under chloroform, you should be able to bring down a leg.

When rupture of the uterus is threatening. There is only one treatment, namely decapitation.

How to decapitate. Decapitation is not difficult. The

FIG. 110. Decapitation scissors.

instruments you need are (1) a Braun's hook, (2) a pair of stout scissors.

Braun's instrument is a blunt hook. Pass it up over the child's neck, guiding it by fingers in the vagina. The arm is
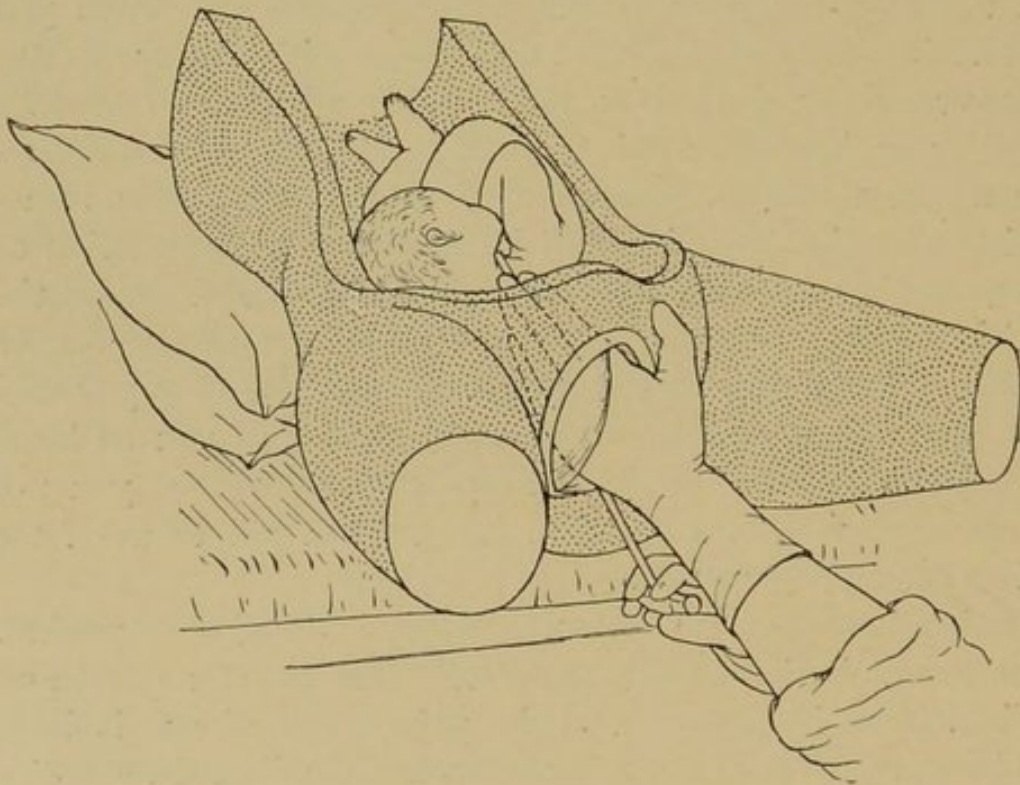

FIG. 111. Passing a Braun's hook.

nearly always prolapsed in these cases, and you bring the neck nearer to you by pulling on the arm. Then by pulling and twisting the hook, break the child's neck. The crack of the broken neck is quite distinct. Pull the neck right down by the hook and cut through it with scissors.

Pull the child's body out by pulling on the arm. If you have any difficulty, cut through the clavicle with the scissors.

To deliver the head. Get the nurse to press the head down into the brim or fix it with bullet forceps. Put on forceps. As you pull, the brain matter is squeezed out through the severed spinal column, and the head collapses enough to come through with ease.

The necessity for crushing the head only occurs when the pelvis is contracted.

One more warning—let no one but the nurse see any part of the mangled child.

TWINS

Frequency. In 5,630 deliveries there have been 71 cases of twins, or 1 in 79.

Presentations. Twins present in the following different ways: (1) both heads; (2) one head, one breech; (3) both breech; (4) one head, one transverse; (5) one breech, one transverse; (6) both transverse, in order of frequency.

Diagnosis. Twins are often difficult to diagnose. One foetus lies in front of the other and obscures it. Very often you do not suspect twins, until, after the birth of the first child, you find the uterus still very large and containing a foetus.

The uterus is larger than normal. Twins are frequently born prematurely in the eighth or ninth lunar month of pregnancy.

Your patient sends for you and tells you she is in labour, but that she is not up to her full time. You inspect her abdomen and find the height of the uterus corresponds to the period of pregnancy, yet the uterus is much broader and bigger than normal. The fundus is especially broad and may have fallen forward a little. There seems in short no more room in the abdomen for this large uterus. Its size makes you think of twins or hydramnios, and the absence of a marked fluid thrill or ballotting foetus (as discovered by vaginal examination), in addition to the signs of twins, enables you to differentiate the condition from that of hydramnios.

Abdominal palpation. The uterus is so full and stretched

that abdominal palpation is often difficult. The most reliable sign given by abdominal palpation is the presence of three large foetal parts. In some cases you make out more than these three large foetal parts, you make out what they are, and you can sometimes outline the lie and presentation of each foetus separately. You may, too, find more than four limbs.

Foetal hearts. If you can distinguish two foetal hearts you can diagnose twins. You are usually told to count one foetal heart and get another doctor to count the other at the same time. But you cannot call in another doctor every time you suspect twins.

Listen for the foetal heart. Put an ink mark where you hear it loudest. Then listen over the rest of the uterus. If you come across another spot of loud foetal heart-sound, put an ink mark over it. Now join the two lines. The sound, which is intense at one of the spots, will gradually decrease as you move your ear to the centre of this line, where it will be absent or almost absent. Then as you listen nearer and nearer to the other mark, the sound again gets louder and louder, until you reach the other intense spot. This is the best way of diagnosing two foetal hearts. You cannot first count one heart and then the other and compare them, for the foetal heart-beat varies quickly with contraction of the uterus, &c.

Vaginal examination. By vaginal examination you diagnose the presentation of the first child.

Course. Twins are usually born without difficulty. They are often premature. Not infrequently you have to correct a malpresentation, commonly of the second child. Locking of twins is an exceedingly rare complication. Post-partum haemorrhage is said to be more common after twins, owing to the stretching of the uterus.

The common order for the birth of twins is (1) the first child, (2) the second child, (3) the common placenta or the placenta of the first, (4) the placenta of the second.

Sometimes the placenta of the first child precedes the birth of the second child.

A further anomaly is sometimes found. One of the twins dies in utero, mummifies, and is crushed by the living foetus.

The parchment-like foetus that results is known as a foetus papyraceus.

Treatment. Let the first child be born naturally, according to the rules of normal labour. Then palpate the abdomen to discover the lie of the second child. If you are not sure, make a vaginal examination to discover the presentation. If a malpresentation is present, let it alone unless it is a cross-birth. Face, brow, and breech, will be born without difficulty. The child is small and the parts already dilated by the first child. If a cross-birth, rupture the membranes of the second sac and do internal version.

In other cases, wait half an hour to rest the uterus and then rupture the second bag of membranes, if they have not ruptured. If the second child does not descend quickly, press on the fundus with the pains and so help the uterus.

Remember always to divide the cord between two ligatures. If the funic circulations communicate in a common placenta, the second twin may bleed to death through the severed but untied placental end of the funis of the first twin.

Locked Twins. Twins may lock in two principal ways and cause obstructed labour. Such locking of twins is fortunately very uncommon.

1. When both heads are down, the second head may press into the neck of the first child and prevent its delivery.

Treatment. Put the patient under chloroform and your whole hand into the vagina and try to push the second head up into the uterus. If you succeed, put forceps on to the head of the first child and deliver. If you fail, the first child is more likely to be dead than the second, and you must perforate the first head.

Fig. 112. Locked twins.

2. The first child presents by the breech, but its head is jammed by the second child, lying transversely or longitudin-ally, and prevented from entering the brim.

Treatment. With your whole hand and the patient under chloroform, try to free the head of the first child and pull the child out. If you cannot do this, the first child cannot be delivered alive. Decapitate it. Then deliver the second child and finally the head of the first child.

FIG. 113. Locked twins.

LABOUR WITH MALFORMED CHILDREN

Under this heading come (1) hydrocephalus, (2) anencephalus, (3) spina bifida and meningocele, (4) monsters, (5) foetuses of abnormal size, (6) abnormally large shoulders.

HYDROCEPHALUS

Frequency. Of 5,630 babies born, 6 had hydrocephalus, or 1 in 938.

Nature. Where there is an excessive amount of cerebrospinal fluid in the lateral ventricles of the child the cranium

is stretched and enlarged.   The condition is known as hydro-cephalus.

The cranium above Reid's base line is formed of bone ossified from membrane.   In the full term foetus, ossification is complete except at the sutures and fontanelles.   When hydrocephalus exists, ossification fails to keep pace with the distension of the cranial membrane.   Consequently the fon-tanelles and sutures of a hydrocephalic skull are far larger and wider than normal.

Fig. 114. Hydrocephalus.   (Rotunda specimen.)

Course.   The large head does not fit the lower uterine segment.   Malpresentations are therefore common.   Breech presentation is especially common and transverse not infre-quent.

If the head lies over the brim, there is especial liability for obstructed labour to occur, leading to rupture of the uterus.   The head does not mould to the pelvic brim, but tends to flatten out, when driven by the pains.   Obstructed labour results. The lower uterine segment is stretched over the large head, and this combined with the tugging of the upper muscular segment makes the lower segment rupture.

If the breech presents, prognosis is more favourable.   The soft after-coming head is compressed as it passes the pelvic

brim and canal and stretches out into a long cylinder, which passes almost as easily as a normal after-coming head.

Diagnosis :

By abdominal palpation it is very difficult to estimate the size of the head. If the head presents, you find that it does not sink into the pelvic canal.

Vaginal examination. You may have to use your half hand in order to reach the presenting head. You are led to suspect or diagnose hydrocephalus by the large size of the sutures and fontanelles. So large are they that a fontanelle has been mistaken for the membranes. But you can distinguish between the two, for you can move the bag of membranes over the foetal bones. We have our suspicions of hydrocephalus aroused, when obstructed labour occurs with a vertex presentation in a woman who has given birth to full-time living children.

Treatment :

Before signs of obstructed labour. If you diagnose hydrocephalus, with the vertex presenting, turn the child and bring down a leg. The head is more easily delivered as an after-coming, than as a fore-coming head. If the diagnosis of hydrocephalus is wrong, you will not have done any great harm by turning.

If the after-coming head cannot be pulled through, it is often difficult to reach with the perforator. Cut with scissors into the cervical vertebrae, and run a gum elastic catheter up the spinal column into the skull. The cerebro-spinal fluid escapes through the catheter, and you can then deliver the shrunken head.

After signs of obstructed labour have arisen. You should not wait for the signs of obstructed labour to become marked, for, as has been said, the lower uterine segment is especially liable to rupture. Perforate the head, if a vertex. If cross-birth or breech presentation, treat according to rules for these. It is better to perforate a hydrocephalic skull, than to subject the mother to risk. A child with hydrocephalus has not the same vital value as a normal baby. It will probably die within a few months, and at best become an unsightly imbecile.

ANENCEPHALUS

Frequency. Of 5,630 babies, 9 were anencephalic, or 1 in 625.

Nature. Anencephalus is thought to be a later stage of

FIG. 115. Anencephalus.   (Rotunda specimen.)

hydrocephalus. The stretched vault of the latter bursts and absorbs, and the vaultless head of anencephalus results.

Course. No difficulty occurs in delivery, except sometimes from the large shoulders. The difficulty of anencephalus is in diagnosis. Anencephalic foetuses are either stillborn or die quite soon.

Diagnosis. You follow the rule of putting the half hand into the vagina when the diagnosis is doubtful, and you feel the ears, face, and vaultless skull. The head descends rapidly, so that there is no cause for anxiety, even if you are puzzled. You can wait till the head is easily reached.

Treatment. The only difficulties are cross-birth or impacted shoulders. Turn a cross-birth and bring down a leg. When the head is born and the shoulders become impacted, cut through the clavicles with stout scissors. This frees the shoulders.

SPINA BIFIDA.   MENINGOCELE

Spina bifida gives rise to difficulty of diagnosis rather than to obstruction. If there is obstruction, perforate the sac. Club-foot is common with hydrocephalus, anencephalus, and spina bifida.

Meningocele is a bulging of the brain, just as spina bifida is one of the cord.   It has no obstetric importance.

MONSTERS

Frequency.   Of 5,630 babies, one has been a monster.

Nature.   Monsters are either single or double monsters. The first rarely give rise to any difficulty, for they are usually small and ill-developed.

Double monsters are more likely to give trouble.

Double monsters are either two foetuses loosely joined, two closely joined, or a monster with two heads and two legs or one head and four legs.   They do not by any means necessarily cause difficult labour, but, being small, are usually born without difficulty.

Diagnosis.   You make the diagnosis by putting your whole hand into the uterus when the patient is under chloroform, because you cannot be sure what the cause of obstructed labour is.

Treatment.   When you have diagnosed a double monster, pull down one leg. If obstructed labour arises, with stout scissors cut the monster up in whichever way seems most likely to effect delivery.   No more definite rule than this can be laid down, for these cases are very variable.

FOETUSES OF ABNORMAL SIZE

The foetus may have ascites, hydrothorax, cystic kidneys, a very large bladder, cystic hygroma of the neck or other tumours which obstruct delivery. A general dropsy may cause the foetus to be of abnormal size.

Diagnosis.   Diagnosis can only be made by putting your whole hand into the uterus.   You are led to do this by

finding that the head or legs enter the pelvic cavity, but progress ceases. You put the patient under chloroform, and insert your whole hand into the uterus to find out what is preventing the rest of the foetus from passing the brim.

Treatment. There is only one treatment, namely, to cut open the foetus with stout scissors, then pull the child down either by forceps or the legs, and cut again with scissors until the child is delivered.

IMPACTED SHOULDERS

The head is born, but the rest of the foetus does not follow. The shoulders are impacted. This often arises from faulty rotation of one shoulder to the front, due to premature pulling on the head. A doctor thinks the case is Vertex I, and as soon as the head is born, he pulls on the head, and tries to twist it, as it would turn in Vertex I. If the presentation is one of Vertex II, his efforts twist the shoulders the wrong way, they become transverse and impacted.

Treatment. Pass the half hand along the mother's sacrum, and take hold of the posterior arm with as many fingers as you can, and bring the arm out of the vulva over the child's chest. If you cannot get the anterior arm down, pull the delivered arm over the child's chest and twist the child a half circle. The anterior arm becomes posterior, and you deliver it in the same way as the first arm. You will sometimes find twisting easier if you first push the child's head up towards the vagina, and free the anterior shoulder. After the birth of the arms, the shoulders quickly follow.

If you fail to do this, you must resort to cleidotomy or cutting through one, and if necessary both clavicles, with stout scissors, guiding them with two fingers in the vagina. Cleidotomy reduces the girth of the shoulders effectually. If the child is alive, cut the clavicle through near the scapular end so as to avoid injuring the large blood vessels.

PROLAPSE OF A LIMB WITH THE HEAD

By this is meant that a hand or foot descends into the pelvis with the head.

Causes. It occurs sometimes with small children such as one of twins, or a premature child. It does not then matter.

But it also occurs when owing to contracted pelvis the head does not fit the pelvic brim properly, but allows a space down which the hand comes at the side of the head. More rarely a foot comes down by the side of the head.

Treatment. Do not interfere in a case of second twin or premature child. Put the patient in the cross-bed position, and find out whether there is sufficient contraction of the pelvis present to prevent the birth of a living child. If not, do podalic version and bring down a foot. If an arm was prolapsed, tie one end of a strip of gauze round the wrist before you do version. Before delivering the after-coming head, by pulling on this gauze you bring the arm down, and prevent its extension.

Dorsal displacement of the arm behind the fore-coming head. We have not yet met this, and are sceptical about it as a cause of obstruction to the head's advance. We do not see how it would prevent the head fixing in the brim. When the head has fixed in the brim, forceps would deliver.

PROLAPSE OF THE CORD

Frequency. In 5,630 deliveries, there were 27 cases of prolapsed cord, or 1 in 208.

Nature. When the umbilical cord can be felt by vaginal examination through the unruptured membranes, the cord presents. If after the rupture of the membranes, the cord comes down in front of or with the presenting part, the cord is prolapsed.

Causes. Prolapse of the cord is impossible, if the lower uterine segment grasps the presenting part. Therefore the causes of prolapse of the cord are the same as those that lead to a communication of the afterwaters and forewaters, with the membranes bulging like a sausage. This bag bursts, much of the afterwaters rush out, they carry the cord, which was perhaps presenting, with them, and prolapse results.

We have dealt with several of these causes already, namely, (1) brow, (2) face, (3) breech, (4) cross-births, (5) twins, (6) hydrocephalus, (7) hydramnios. Other causes which prevent the presenting part coming down to the lower uterine segment and so make a prolapsed cord possible are (8) contracted pelvis, (9) tumours preventing descent of the foetus.

Danger. A prolapsed cord does not add to the risk of the mother, but half the children are stillborn. The head presses on the cord and stops its circulation. In breech cases, the breech does not compress the cord as dangerously as does a fore-coming head, but prolonged pressure of the breech on the cord is bad and the cord should be replaced.

Diagnosis. You can only diagnose a presenting or prolapsed cord by vaginal examination. Its importance is such that whenever you find the presenting part is not fixed, you should make a vaginal examination to see if the cord is prolapsed, immediately after the rupture of the membranes. When you feel the cord, you cannot well mistake it for anything else. Carefully notice if it is pulsating, and if it is, count the number of pulsations.

Treatment :

Before rupture of the membranes—presentation of the cord. If you feel the cord has come down to one side of the presenting part, get your patient to lie on the same side. The fundal pole of the foetus then falls over to the side on which the patient lies. The presenting pole swings a little in the opposite direction and so does not press on the cord. How much good this does one cannot say, but it is worth doing. Many writers advise you to do bipolar version, on the ground that, if the cord prolapses, it is safer for the child to be born by breech than by vertex. We, as a rule, wait until the membranes break and the cord prolapses, as we find the cord can be replaced in the majority of instances.

After rupture of the membranes ; prolapse of cord. Take the cord between two fingers and feel if it is pulsating. If it is not pulsating, there is no good in replacing it. If it is pulsating, treatment depends on whether you can put on forceps and deliver at once or not. The head must be fixed by its largest diameter in the brim and the os fully dilated to

permit of forceps. This you will rarely find, and you have to replace the cord.

Replacing the cord. Put the patient in the cross-bed position with a pillow under her buttocks. Chloroform, as a rule, is not essential. Pass the whole hand into the vagina and gather up as many loops of the cord as you can in the palm of your hand. Lift them up to the os and attempt to push the cord bit by bit past the presenting part. This method generally fails to replace the cord and keep it replaced. Then replace the cord with a repositor.

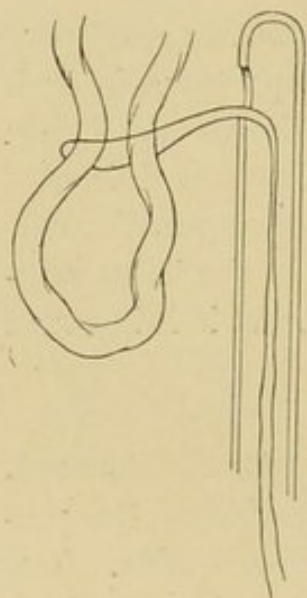Pull a loop of cord out of the vulva. Take a No. 12 or No. 14 male catheter for your repositor. Push a loop of sterile silk through it with the stylet. Pull the loop out of the eye of the catheter. Pass this loop round the cord and then pass it again into the upper niche of the eye-hole of the catheter and fix it there by pushing the stylet home through the loop. Draw the loop of silk tight enough to hold the cord loosely, but not compress it. Then guiding the catheter with fingers in the vagina, push the catheter into the uterus up to the fundus. This carries a considerable length of cord into the uterus and you can then with your hand in the vagina push any remaining cord over the presenting

Fig. 116. Catheter and loop of silk, used as a repositor.

part. The nurse or an assistant pushes the presenting part down into the brim to occlude the passage down which the cord has slipped. Withdraw the stylet and then withdraw the catheter. This frees the cord. Do not withdraw the hand from the vagina until you have withdrawn the catheter and feel that the presenting part has been pushed into the brim, and that the cord has not again prolapsed. Unfortunately, in some cases the cord again prolapses. Some have, therefore, advised leaving the catheter in the uterus, but practically this has been found to incur a great risk of strangulation of the cord in the loop of silk.

If the cord prolapses when released, replace once more by means of the repositor.

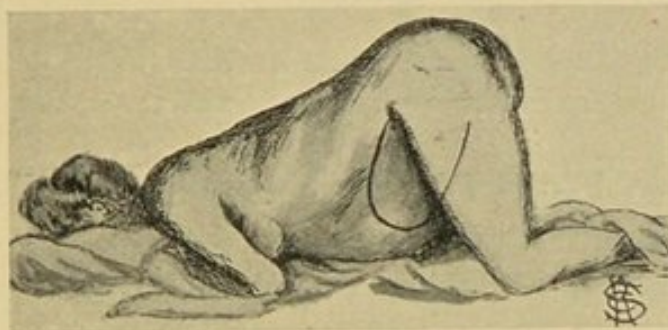If successful, put your patient as far as you can in the

Fig. 117. Knee-elbow position.

knee-elbow position. In this position the fundus hangs down, and gravity prevents the cord again prolapsing. The next best position is the Trendelenberg, which can be arranged by
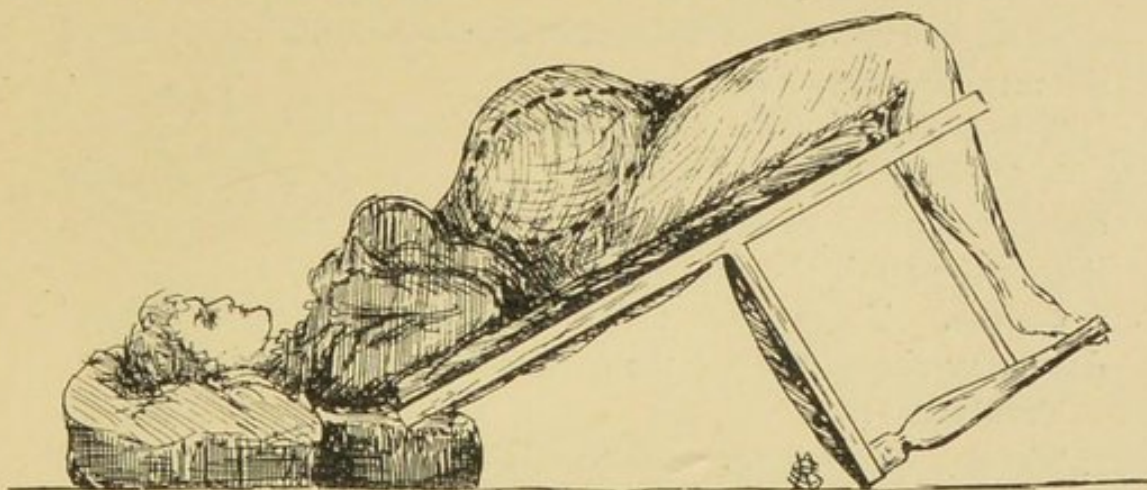

Fig. 118. Trendelenberg position.

the use of a kitchen chair. As soon as you can put on forceps and deliver, do so.

CHAPTER XI

ABNORMALITIES CONNECTED WITH THE UTERUS

Non-dilating Os—Uterine Inertia—Precipitate Labour— Labour with Malformed Uterus—Threatening Rupture, and Rupture of the Uterus.

NON-DILATING OS

Rigidity of the os. On rare occasions the os dilates with extreme slowness, or does not ever dilate fully.

The reasons for this are—

1. Early rupture of the membranes—the dilating power of the membranes is lost.

2. Scarring or other pathological defect of the cervix.

3. Probably in many of these cases the os is congenitally defective, so that even though stretched to its utmost capacity, it cannot permit the passage of the head without tearing.

Course. These cases result in tedious labour. Several days may elapse and yet the os scarcely gets any bigger.

Treatment:

The non-dilating os. Patience is the only treatment, unless the mother or foetus begin to show signs of distress. Make the patient sleep by giving chloral and opium. Chloral, especially, seems to favour the dilation of the os.

If either mother or child show signs of distress, put the patient in the cross-bed position and dilate with Frommer's dilator or, if you have not got one, with your fingers. As soon as you can get the forceps through the os, put them on and deliver the child. After delivery, examine and stitch up the cervix, for there is almost certainly a bad tear.

The os that does not dilate because the membranes have ruptured before dilatation. In nearly all cases the presenting part of the foetus comes down and dilates the os. A large

caput forms. The first stage is often tedious and may last some days.

When either the mother or child shows signs of distress you must dilate the os artificially, either (1) by your fingers and hand, (2) by Champetier de Ribes' bag, (3) by Frommer's dilator. These methods have been described (p. 140). Of the two, if you have the bag, it is the preferable method. In fact, if, with early rupture of the membranes, you find that the os is scarcely any larger at the end of twenty-four hours than at the beginning, dilatation with de Ribes' bag is an efficient and satisfactory treatment.

Hot vaginal douches are also worth trying, for the heat softens the os and helps it to dilate. Similarly, sterile wool plugs soaked in boiled glycerine and pushed against the os for eight hours help to soften it.

UTERINE INERTIA

Uterine inertia is either primary or secondary.

Primary inertia. The uterine pains from the commencement are weak and feeble. They have small effect on the dilatation of the os and the advance of the child.

Causes. It is more common in primiparae than multiparae, but nothing is really known about its causes.

Practically a full bladder or full rectum seems to interfere with the pains and make them feebler.

When premature rupture of the membranes occurs, feeble pains are very likely to follow. An overstretched uterus, from twins or hydramnios, often contracts feebly.

Sometimes the presence of the doctor in the room makes the contractions of the uterus feebler. He is said to drive away the pains.

Course. Labour is very tedious, but there is no particular danger to the mother or child. The mother gets weary of the delay, but she is not exhausted as she is by strong uterine contractions.

Treatment :

Before rupture of the membranes there is no need of any special form of treatment. Give the patient a purge and

tell her to pass her water frequently. We give quinine in five grain doses, or a hot vaginal douche; in some cases with apparent benefit.

After rupture of the membranes. If the os is not dilated and does not dilate, you treat it as described in the last section. Empty the bladder and give an enema. Do not leave a patient with primary uterine inertia more than two hours in the second stage, that is to say from the time when the rim of the os can no longer be felt. At the end of that time deliver her, either by forceps, or if breech by pressure on the fundus combined with pulling on the breech. Her labour has been so tedious, that longer delay wearies and exhausts her.

Although contraction is feeble, retraction is good and there is no special liability to post-partum haemorrhage.

Secondary uterine inertia. In secondary uterine inertia the pains have not been feeble from the commencement. They, on the contrary, have done their best to drive out the foetus and have exhausted themselves in the attempt. Primary uterine inertia is due to a feeble uterus; secondary, to an exhausted uterus. The feeble uterus is able to retract, the exhausted uterus can neither retract nor contract. The importance of this distinction cannot be sufficiently emphasized. To deliver the feeble uterus of a foetus, is good treatment, to deliver an exhausted uterus is treatment which greatly endangers the mother's life, for post-partum haemorrhage will occur, because the exhausted uterus cannot contract and retract to stop the haemorrhage.

Course. The patient is commonly a multipara who has had children in rapid succession. The pains may be strong, but fail to deliver the child. The uterus becomes less active, the pains are feebler, shorter, and at longer intervals, and eventually cease. The patient, probably, falls to sleep or dozes. She awakes refreshed, the strong pains are renewed and either the child is delivered, or a second period of exhausted uterus supervenes or tonic contraction of the uterus threatens.

Treatment :

The condition has only to be treated after rupture of the

membranes. You must never attempt to deliver a child when exhaustion of the uterus has come on, not even if the head is on the perineum. The patient tends to sleep. Give her morphia (gr. $\frac{1}{4}$) hypodermically to assist her to do so. Tell the nurse to send for you as soon as the patient wakes. If the pains of the refreshed uterus do not deliver the child in a quarter of an hour, deliver artificially by forceps, or if it is a breech, by pressing on the fundus and pulling on the breech with the pains.

PRECIPITATE LABOUR

Either true precipitate labour may occur, or the baby may be born unexpectedly, because the mother is insensitive to the labour pains.

Dangers. The dangers are chiefly to the child. The mother may be standing up at the time and the child fall out on the floor and break its head. Again, the mother may feel a bearing-down sensation and go to the closet to empty her bowels. The child may be born in the pan and be drowned. The cord may break and the child bleed to death.

The chief danger of true precipitate labour to the mother is that her perineum may get badly torn. Some writers say that inversion of the uterus and post-partum haemorrhage occur. But inversion does not occur unless the uterus is relaxed, and post-partum haemorrhage does not occur in a uterus that contracts strongly; therefore, without figures to prove these statements, we are sceptical about them.

Treatment. You do not as a rule get to your patient in time to treat her. If she has a history of previous precipitate labour, keep her in bed, and if the pains are very violent, control them with chloroform.

LABOUR WITH MALFORMED UTERUS

A malformed uterus either is sterile or, if it becomes pregnant, is in no way different to an ordinary uterus. The child is delivered and the malformation is often not detected at the time.

Pregnancy in a rudimentary horn is clinically a case of tubal pregnancy.

THREATENING RUPTURE, AND RUPTURE OF THE UTERUS

There are three varieties of rupture of the uterus: (1) that which is shown by statistics to be most common, namely, rupture preceded by warning signs and symptoms; (2) the quiet rupture, not preceded by warning signs and symptoms; (3) rupture following manipulations. We deal separately with them.

1. **Rupture, preceded by the signs known as those of threatening rupture.**

Causes. Anything which leads to obstructed labour may lead to rupture of the uterus. The chief are: (1) contracted pelvis; (2) malposition of the child, especially cross-births; (3) hydrocephalus; (4) obstruction by tumours. Pendulous
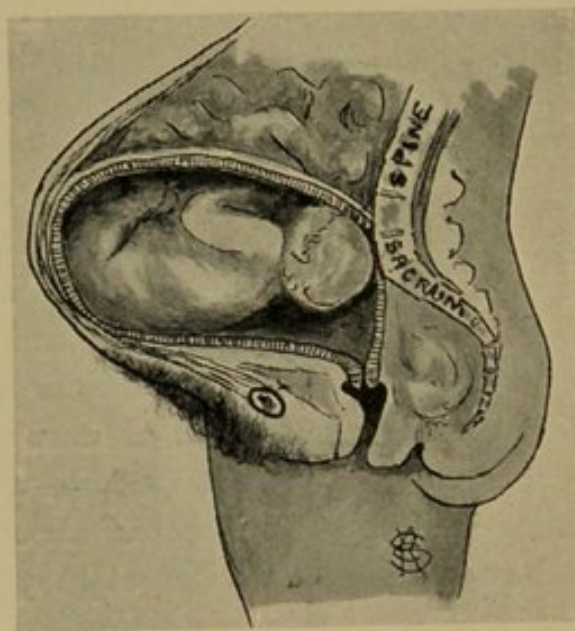

FIG. 119. Diagram to show how pendulous abdomen tends to produce rupture of the uterus.

abdomen is a cause of rupture of the uterus, which may or may not be preceded by warning signs. The direction of the push of the uterus is backwards against the sacral promontory and the head is usually the foetal part pushed against the promontory. The uterine wall between the bony head and sacrum gets pinched and crushed, and eventually is worn through or gives way from being too tightly stretched over the head.

Rupture of the uterus rarely, if ever, occurs before rupture of the membranes.

Signs and symptoms of threatening rupture, with diagnosis

Tonic contraction of the uterus. The uterine muscle stimulated by the difficulty it encounters, puts forth greater and greater efforts. The pains last longer, are stronger and more frequent. Relaxation between the pains is less and less complete, and eventually the contractions of the uterine muscle become continuous or tonic. The uterus moulds itself to the child, but so tense is the muscle that you cannot feel the foetal parts. At the most, you can conjecture the lie of the child by the cast formed by the moulding uterus. The hard uterus is often *very tender*.

Bandl's ring also forms. Bandl's ring is the lower border of the retracting muscle of the upper muscular segment of the uterus, separating it from the stretched and thinned lower uterine segment. The more the thick muscular part of the uterus contracts and retracts, the higher this border becomes and the more the lower uterine segment is stretched. The height of Bandl's ring from the fundus measures the amount of retraction of the driving muscle of the uterus. The height, therefore, of Bandl's ring is a measure of the danger of the case.

Fig. 120. Diagram of Bandl's ring. A. Bandl's ring; B, Internal os; C, External os.

You can see it as a groove below an edge which you feel running obliquely across the abdomen. It is said that when Bandl's ring rises two and a half inches above the pubic bone a dangerous thinning of the lower uterine segment is present. This is true in nearly all cases in our experience. Bandl's ring runs obliquely across the hypogastrium. We do not know why it is oblique, but it is a fact, and a useful fact. It is useful because it helps to distinguish Bandl's ring from the only thing for which it may be mistaken,
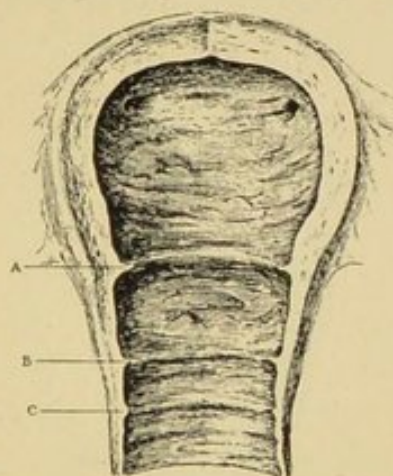
namely, the upper border of a full bladder. The upper border of a full bladder passes transversely across the hypogastrium, and the groove into which your fingers sink is above this border, and not below as with Bandl's ring. Always pass a catheter, however, pushing up the presenting part, if you can, so that the catheter can slip into the bladder. Sometimes the presenting part is jammed so tight that you cannot get a catheter past it into the bladder.

Round ligaments. In normal labour the round ligaments can be felt, especially the left, owing to the normal twist of the uterus bringing the left side more to the front than the right. When rupture of the uterus is threatening, the muscle of the round ligaments shares in the tonic contraction of the uterine muscle. The round ligaments stand out prominently, and are hard and taut.

Vaginal signs. On making a vaginal examination, you find the vagina is unnaturally hot and dry. Its walls are swollen,
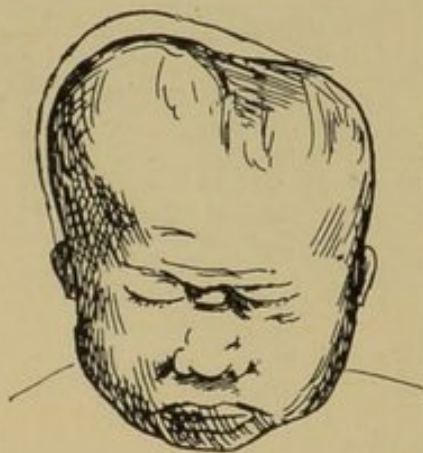

FIG. 121. Large caput of difficult labour.

and the labia are oedematous. You find that the presenting part is probably high up, and is obscured by a large caput; that the upper part of the vagina is pulled up, stretched and spacious — the ballooned vagina. With a pain, there is no advance of the presenting part, nor can you push it up after the pain. You may find a little bleeding, showing that some uterine fibres have given way already. The border of the cervix may be thickened from blood effused into it.

Effect on the mother. The woman herself is profoundly affected by the uncontrollable violence of the contractions of her uterus. She experiences the agonizing pain well known to every one as cramp, only she has cramp in her womb, and not in her calves. As the calves become tender from cramp, so her womb is very tender. She shrieks out with pain if your abdominal palpation is at all forcible. She

is full of anxiety, and acutely conscious of the terrible crisis through which she is passing. Her eyes are haunted by the fear of impending death, her face is drawn and pinched with pain and exhaustion, her lips and mouth are dry, with sordes on her teeth. She moans continuously, her breath is quick and panting, her rapid pulse grows more rapid and feeble, sometimes uncountable, and her temperature continues to rise. Only when rupture occurs does relief come to her, and then it is the relief of profound shock, or the release of death.

Effect on the child. The retraction and contraction of the uterus so cramp and interfere with the placental circulation, that the child shows signs of asphyxia. It moves and kicks violently, solid meconium comes away, although the head presents, and the heart, when the uterus is relaxed, is either over 160 or under 120. But as tonic contraction approaches, you find the heart either uncountable or very slow, and then you fail to hear the heart, for the child dies.

Secondary uterine inertia. But the symptoms and signs may not become so urgent as those we have described, and, before real danger occurs, exhaustion of both mother and uterus supervenes, this exhaustion being the condition known as secondary uterine inertia.

Treatment of threatened rupture. *Immediate delivery is the one and only treatment.* Put your patient under chloroform. (1) If the head presents, and you have recently heard the foetal heart, put on forceps and pull; (2) if symptoms are urgent, the child is dead, do not hesitate to perforate; (3) if the breech presents, treat as under impacted breech, and perforate the after-coming head if there is any delay; (4) if transverse, decapitate; (5) if the pelvis is too small to allow even a perforated and eviscerated child to pass, you have to do a Caesarian section.

Rupture following the signs of threatening rupture

Where the rupture occurs. In most cases the lower uterine segment is tightly stretched over the child's head, and tears transversely where it is most stretched and thinned. Sometimes it is most stretched over the child's shoulder.

When the tear has started, it may extend in any direction up to the fundus and down into the vagina. The important practical fact about the tear is whether the peritoneum has been torn or not. Rupture without tear of the peritoneum is called incomplete, and is less dangerous, for peritonitis is less likely to arise. Rupture with tear of the peritoneum is called complete, and is more dangerous. It is, however, more easy to diagnose, for a part or the whole of the foetus protrudes, and is readily felt through the abdominal wall.

Effect on the mother. Great haemorrhage, either internal or external, or shock, may kill her very quickly. She may have shock which is not desperate, but is followed by dangerous collapse owing to loss of blood. She may eventually die of peritonitis. She may recover. At the time of rupture, the change of aspect in the mother is striking. She may cry out and say that something has given way inside her. She then passes from a condition of acute tension to one of profound shock. Her face is no longer pinched and drawn, but smooths out with the relaxation of the shock-paralysed muscles. The hot, congested face of exertion becomes pale and cold. A clammy sweat appears on the forehead and cheeks. Her breathing, no longer panting, is now soft, shallow, and almost inaudible, except for an occasional moan. She no longer cries out with pain, but lies back prostrated, relaxed, almost lifeless. Her pulse is very feeble and quick if she has lost blood, or in some cases may be feeble and slow. Her temperature may be sub-normal.

The change is not always so radical as this. The woman undergoes shock, but she is not so profoundly affected. Still the change is always both striking and sudden.

Diagnosis. The change of aspect in the woman will make you think the uterus has ruptured. You then examine by *abdominal palpation*. What you find depends on whether the tear is complete or incomplete.

Complete. Some part of the foetus will escape through the rent Sometimes the whole foetus is free in the peritoneal cavity. In either case you feel the foetal parts with a surprising ease, which is in such marked contrast to the previous condition, that you cannot be in any doubt at all.

Incomplete. You may not be able to feel anything more than that the uterus bulges at one part. In both complete and incomplete rupture you feel the hard body of the uterus separate from the foetus or the swelling. It is so hard that it has been mistaken for the foetal head.

By vaginal examination you can make sure of the diagnosis. You previously felt the presenting part, but now you find it has receded. This is a certain sign and is present in incomplete as well as in complete tears. There is haemorrhage of varying extent. Sometimes it is profuse, sometimes mainly internal and shown by increasing collapse, although sometimes the amount of haemorrhage is surprisingly small.

2. **Quiet rupture.** This is the form of ruptured uterus which is not preceded by signs of threatening rupture. It is not uncommon in Ireland, where contracted pelvis is rare. It occurs without any warning whatever, when apparently all is well.

Cause. The cause is not known. We have seldom seen rupture of this nature in which the tear did not involve one of the vaginal fornices, or did not occur in a multipara who had had previous difficult labours. We think, then, it may be the extension of a tear which occurred in previous labours.

Symptoms and signs. Shock may overcome the woman immediately and you feel the child readily through the abdominal walls. Sometimes, with incomplete tears, there may be no symptoms at the time enough to arouse your suspicions of rupture and the child may be delivered without your suspecting rupture. Then the gradual onset of collapse, or the non-expulsion of the placenta, or later sepsis leads to your making a vaginal examination and you then find the rent. By abdominal and vaginal examinations you feel what has already been described.

3. **Rupture as the result of manipulations.** (1) Attempts to turn, when the uterus is already approaching tonic contraction ; (2) vigorous pulling, or pushing from the abdomen, of the foetus through an undilated os ; putting too many fingers through the os in a case of placenta praevia – all three are not uncommon causes of rupture of the uterus.

The signs and diagnosis have already been given.

Treatment of ruptured uterus. With profound shock, chloroform will not be necessary. We advise you to avoid laparotomy, as far as you can. In nearly all cases you can deliver the child. With the mother in the cross-bed position, pass your hand into the uterus, even through the rent into the peritoneal cavity, if necessary, and catch the child by both feet. Deliver it as a breech. There is always risk of extending the tear, but the case is full of risks and laparotomy is a very great risk which we do not recommend to the general practitioner. Remove the placenta manually.

If you cannot deliver the child, you are of course compelled to open the abdomen in the middle line, deliver the child and placenta and make some attempt to sew up the tear. Such a case will be a very hopeless one. In hospital, laparotomy is not quite so hopeless.

What to do after delivery. Take a long strip of iodoform gauze and, with your plugging forceps and hand in the vagina, loosely plug the rent with the gauze. Do not douche at all. Withdraw the gauze after three days and do nothing more to the uterus. Treat the shock and collapse in the manner described under accidental haemorrhage.

Keep the patient on her back and absolutely quiet for ten days, drawing off the urine with a catheter and making her use a bed-pan.

This treatment, though simple, brings about as good results as operative treatment, and many women so treated have recovered. It stops the haemorrhage without adding to the shock.

If general peritonitis arises the case is wellnigh hopeless. The only two treatments to follow are (1) by laparotomy, to wash out the peritoneal cavity and drain it; (2) to treat expectantly with hot vaginal douches night and morning, the can being never raised more than two feet above the bed—but it is almost impossible to select a treatment, when in any event the prognosis is almost hopeless.

CHAPTER XII

ABNORMALITIES CONNECTED WITH THE PELVIS

Contracted Pelvis—Varieties—Signs before Labour—Treatment before Labour—Signs after Onset of Labour—Treatment after Onset of Labour.

THIS includes pelves contracted either (1) by malformation, or (2) by tumours. They are classed together as contracted pelvis.

Contracted pelvis. The subject from a practical point of view falls under the following headings:—

1. The different kinds of contracted pelves.

2. Signs before labour.

3. What to do before labour.

4. Signs after labour has commenced.

5. What to do after labour has commenced.

I. The different kinds of contracted pelves

A great number of different kinds of contracted pelves are described. The majority of them are very rare. The common kinds are (1) the flattened pelvis, (2) the generally contracted pelvis, (3) the small rickety pelvis. From a practical point of view, the rarer kinds of contracted pelvis that bring about difficult labour lead to treatment similar to that for

the cases of common contracted pelves. This is a point that we would emphasize. Only a specialist can be expected to remember the differential diagnosis between those rarer forms of contracted pelves, for they are so rare that he alone is likely to meet with more than one or two cases in his lifetime.

Therefore, when you go to a case in which the shape of the pelvis prevents the proper delivery of the child, what you have to discover is whether the contraction is due to a smallness of all the diameters of the inlet, or whether the antero-
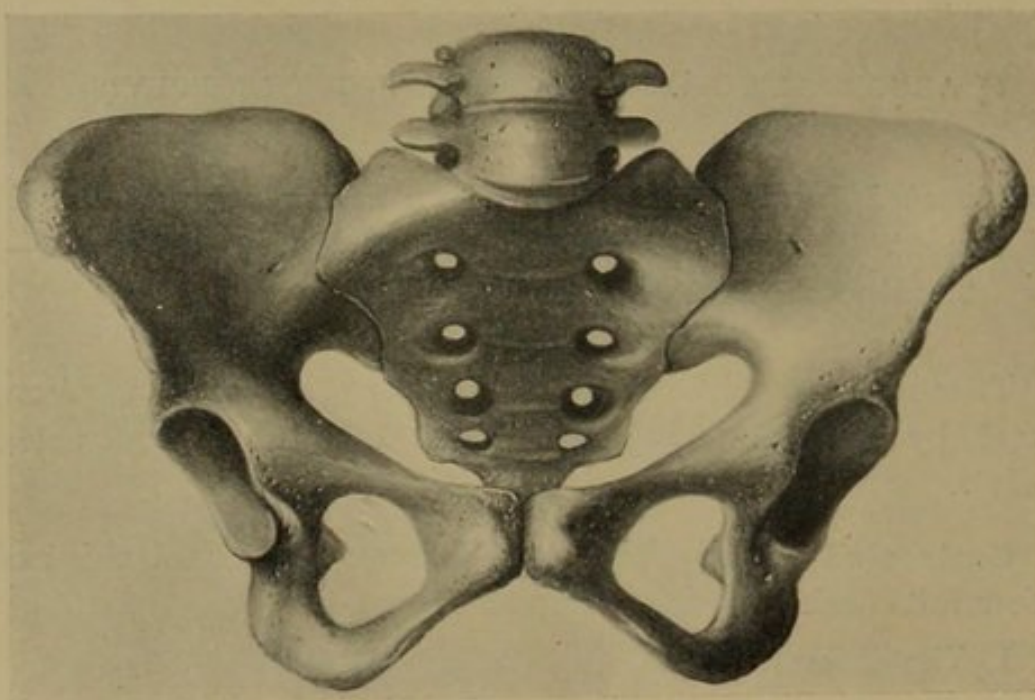
Fig. 122. Normal pelvis.

posterior diameter alone is shorter than normal. As a general rule you will have no difficulty in doing this.

The rarer forms of contracted pelvis are—

1. **Osteomalacic pelvis,** due to the disease called osteomalacia. The contraction is triradiate, and in extreme cases the bones are crumpled inwards. In this disease all the bones become soft from loss of the salts of phosphorus and lime. It rarely occurs apart from pregnancy. Clinically it is characterized by rheumatic pains, inability to walk, and

great tenderness over the bones. You may think your
patient has rheumatism, until the difficulty of her labour gives
you the clue to her disease. The best treatment, by which to
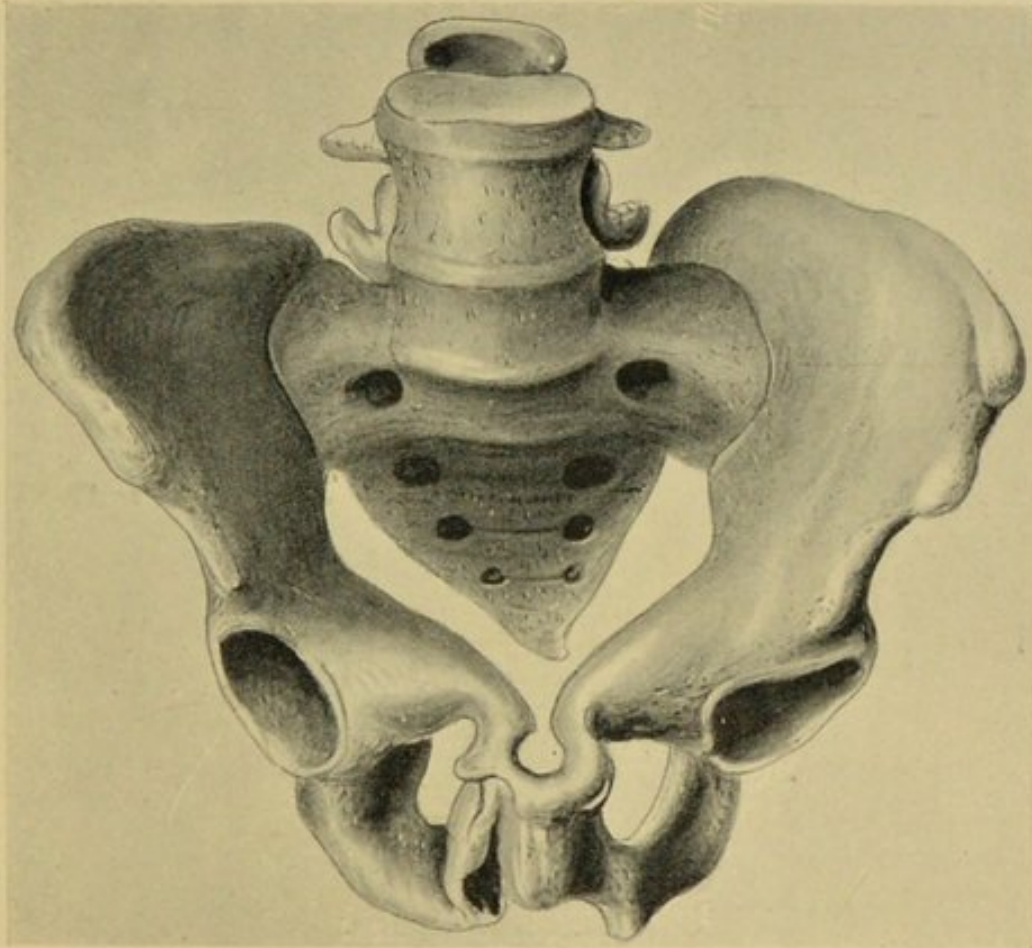prevent the further progress of the disease, has been found

FIG. 123. Osteomalacic pelvis.

to be a double oophorectomy. The pelvis you can diagnose
by taking the beaked pubic bones between your finger and
thumb. They feel like the peak of a bicycle saddle.

The next three pelves are due to disease of the vertebral
column.

2. **Kyphotic pelvis**. Kyphosis of the spine in the lower
lumbar region pulls the upper part of the sacrum back. This
flattens the pelvis from side to side, especially at the outlet, and
makes the pelvic canal like a funnel. If the deformity is not

extreme, and the child's head passes into the pelvis, its further progress becomes arrested at the outlet.

3. **Scoliotic pelvis.** Marked scoliosis of the lumbar region distorts the shape of the pelvis. As scoliosis is often due to
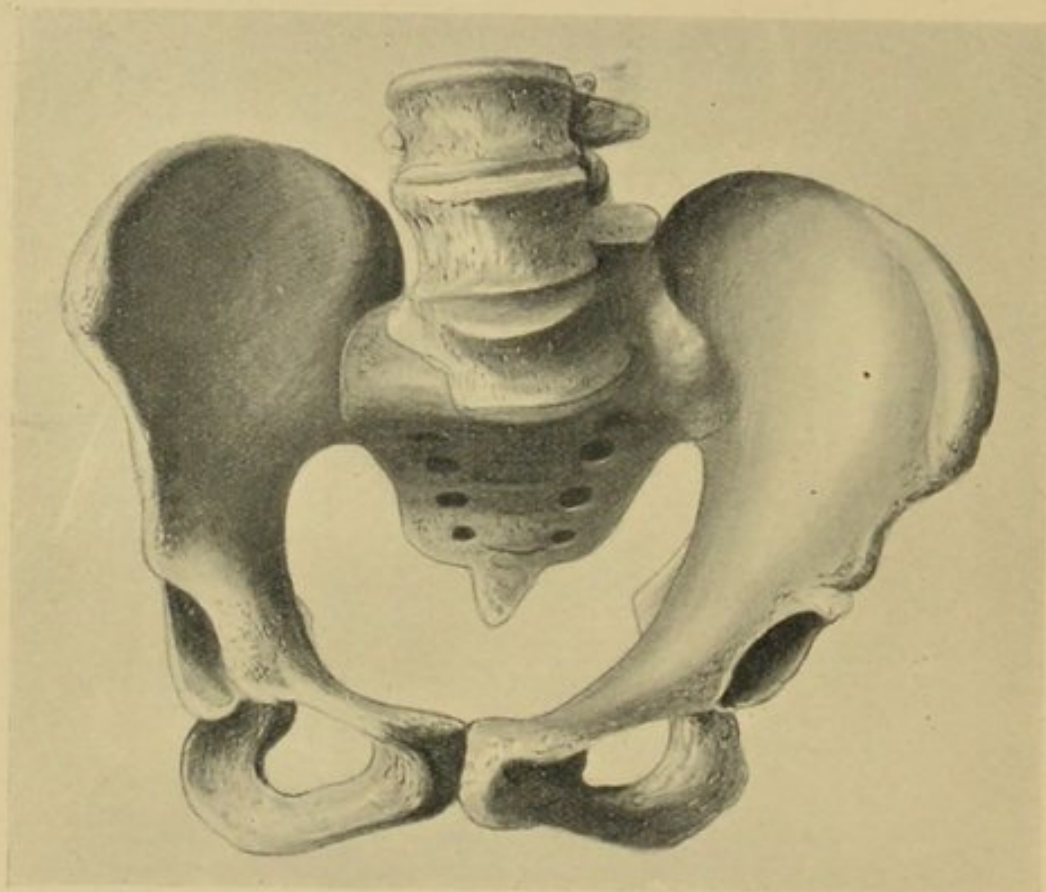

FIG. 124. Scoliotic pelvis.

rickets, it may add its distortion to that of the small rickety pelvis.

4. **Spondylo-listhetic pelvis.** This is a very rare form. The last lumbar vertebra is dislocated forward on the sacrum and blocks the pelvic inlet. The dip of the fifth lumbar vertebra may be seen and felt from behind.

The next two rare pelves are due to failure of development of the lateral mass of the sacrum.

5. **Naegele's oblique pelvis.** In this one lateral mass of the sacrum becomes developed and the other is not developed, and there is firm union and no joint between the sacrum and ilium. The posterior superior spine on the non-developed

side is found to be much closer to the sacral spines than that of the other side. The oblique diameters of the inlet of the pelvis are flattened, but not so much as to imperatively call for Caesarian section.
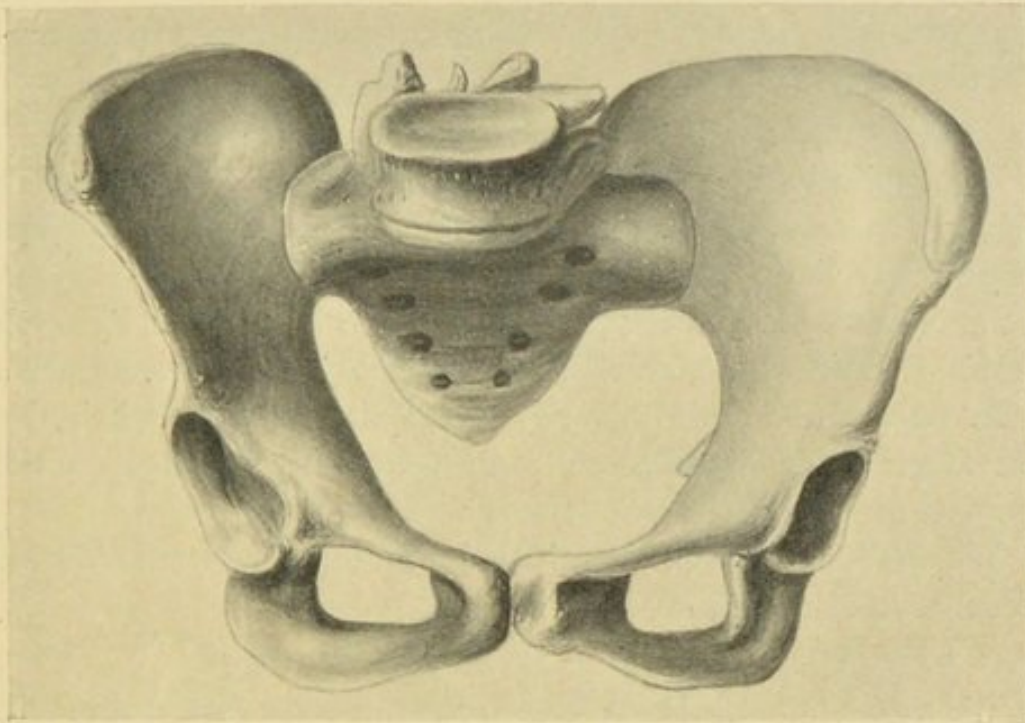

Fig. 125. Naegele's pelvis.

6. **Robert's pelvis.** In this both lateral sacral masses are undeveloped, the posterior superior spines are much closer to the sacral spines than normal, and the pelvis is greatly flattened from side to side.

The remaining rare contracted pelves are—

7. **The funnel pelvis.** This is very rare. The diameters of the inlet are normal, but the pelvic cavity narrows to the outlet. The head, as in kyphotic pelvis, becomes arrested in the cavity at the outlet.

8. **Contraction due to old fracture.** Distortion of any nature may result.

9. **Contraction from bony or cartilaginous tumours of the pelvis.** Again distortion of any nature may occur.

10. **Contraction from hip disease.** The shape of the pelvis is altered by hip disease because the muscles of the thigh normally influence the developing shape of the pelvis markedly.

The amount of distortion of the pelvis depends on the degree of the disease, and the age at which it began.

11. **Pelvis of congenital dislocation of the hips.** This condition causes a slight flattening of the pelvis and hence some obstruction to a normal child, but congenital dislocation of the hips causes a wobbly gait and makes you suspect that contracted pelvis may be present

Treatment of the rarer forms of contracted pelvis

In kyphotic pelvis, funnel-shaped pelvis, and Naegele's pelvis, you may be able to pull the child through with forceps or you may have to perforate.

In osteomalacic, scoliotic, spondylo-listhetic, and Robert's pelvis, Caesarian section will probably be your only treatment.

In pelves distorted by bony or cartilaginous tumours, by old fracture, or hip disease, your treatment depends on the amount of distortion.

We shall not again refer in this section to the rarer forms of contracted pelvis.

Commoner forms of contracted pelvis

We now deal with the commoner forms—(1) flattened pelvis, (2) generally contracted pelvis, (3) the small rickety pelvis.

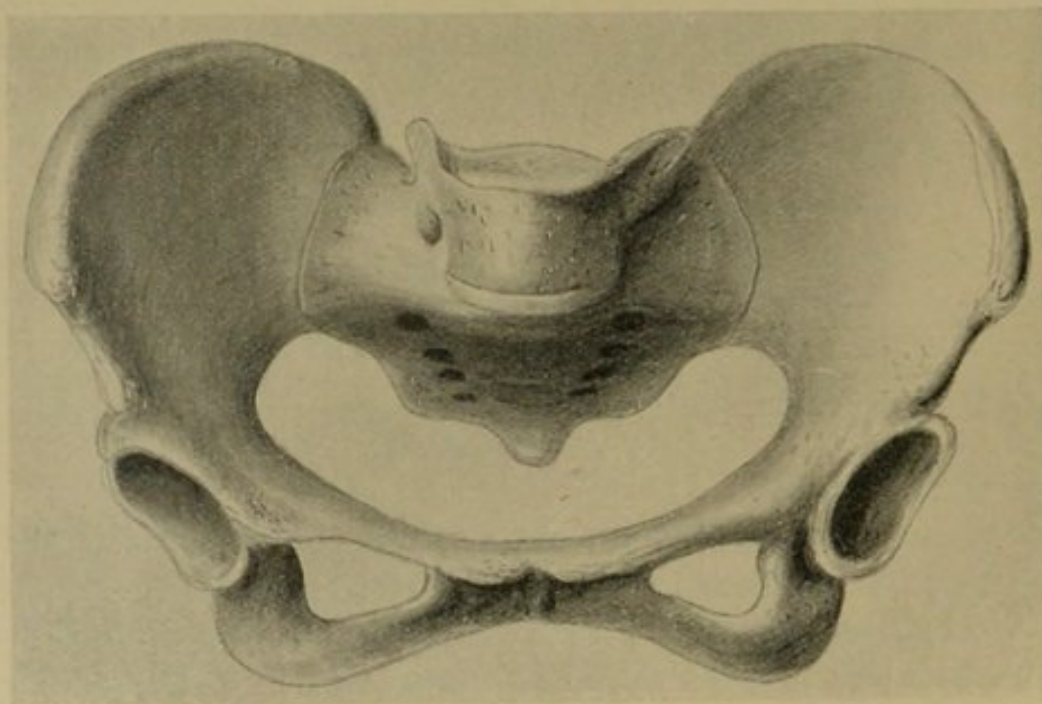1. **Flattened pelvis.** In this pelvis, the sacral promontory

Fig. 126. Flattened pelvis.

sinks down and forward more than normal, and so the pelvic inlet is flattened from before backwards. It is the commonest form of contracted pelvis, and slight degrees of it are frequently found.

No cause of this form of pelvis can be found as a rule. Sometimes, however, you may get a history of rickets, but seldom physical signs of rickets.

Characters of a flattened pelvis. The antero-posterior diameter of the inlet, which normally is four inches, is less than four inches. The sacral promontory bulges forward. The transverse diameter is either unaltered in width or is wider than normal. The iliac fossae look more forward than normal if the flattening is rachitic, in which case the widths between the anterior superior spines and the iliac crests are, however, much the same in measurement, though they are as great or greater than the normal widths.

2. **Generally contracted pelvis.** The bones of this pelvis are smaller than normal. No reason for the generally contracted pelvis is known. It is impossible to tell, or even suspect, the existence of a generally contracted pelvis from the appearance of the woman. She may be strong and well developed in every other respect.

Characters of a generally contracted pelvis. The pelvis is in all respects like a normal pelvis, only the diameters are smaller, by one-half to one inch. If smaller than this, signs of rickets will be found in addition.

3. **The small rickety pelvis.** Bad rickets profoundly alters the skeleton. The bones are smaller than normal; they are distorted and are embossed at the epiphysial lines. All these signs of rickets are found in the small rickety pelvis resulting in very marked narrowing, through which neither a living nor often even a perforated child can be pulled.

Characters of small rickety pelvis. The limited growth of the rickety bones leads to a condition like the generally contracted pelvis. In addition, rickets leads to falling forwards of the sacrum and the pelvis is flattened. The epiphysial lines of the sacral vertebrae and symphysis are thickened and embossed. The softness of the bones in extreme cases is so great that crumpling of the bones occurs, as in osteomalacia, and the

pseudo-osteomalacic pelvis results. Finally scoliosis, due also to the rickets, may add its special distortion.

The patient. The patient is short and ill formed. In a bad case she is a dwarf. Examine her wrists for epiphysial thickening, her ribs for the rickety rosary, her legs for knock-knee, curved tibiae, and femurs, her head for the prominent forehead of rickets, and her mouth for the ill-developed teeth.

II. Signs before labour

You should suspect contracted pelvis in any woman who has had hip disease ; who walks with a limp ; who has or has had disease of her spinal column and in whom you find kyphosis or scoliosis of the lumbar region ; who has a marked pit into which you can press your finger just above the sacrum, pointing to dislocation of the fifth lumbar vertebra (spondylo-listhesis); who has had an injury to her back ; who has signs of rickets ; who is a dwarf ; whose pelvis, when you see her in bed, seems twisted ; or who complains of severe pain and tenderness in her bones and increasing difficulty in walking. If you see a primipara with a pendulous belly, beware of contracted pelvis. The presenting part of the child in the last weeks of pregnancy sinks into the pelvis. If this cannot happen, the abdomen falls forward with the weight of the child, which rests on the abdominal wall and not on the pelvic bones.

If, on palpating a primipara in the last three weeks of pregnancy you find a malpresentation, suspect contracted pelvis. Inquire into a multipara's history of her previous labours and suspect contracted pelvis if they have been difficult. Lastly, as a precaution, you can measure all primi-parae externally at the end of the seventh month, and if there is contracted pelvis, these measurements warn you of its exis-tence. We do not measure our cases in private in Ireland, unless we have some reason to suspect contracted pelvis, for contracted pelvis is rare in this country.

III. What to do before labour

Ask your patient to stay in bed, and go and see her. Then take her external measurements.

External pelvimetry. You measure with either Duncan's,

Baudeloque's or Martin's pelvimeter. If you only have Skutsch's pelvimeter, that will do equally well.

The measurements that you take are (1) the interspinous, (2) the intercristal, (3) the external conjugate.

To measure the interspinous diameter. Sit on the edge of the bed facing your patient, who lies on her back. Fold the sheet over the hips and thighs so as not to expose her. Then feel with your thumbs or index fingers for the outer edge of the anterior superior spines and press the points of the pelvimeter against these outer edges. Keep the instrument in place and read off the scale. The average measurement is $10\frac{1}{4}$ in., or 25 to 26 cm.

To measure the intercristal diameter. Take the points of the instrument between your fingers and thumbs and move each point on each side along outer edge of the intercristal border. When you find the greatest width between the crests read off the measurement. It is $11\frac{1}{2}$ inches, or between 28 and 30 cm.

Importance of these measurements. Separately, these measurements have little or no importance. But the relationship between the two is of importance. As we have already said, in flattened and rachitic pelvis the iliac fossae look more forward than normal, and the width between the spines approaches and even equals the width between the crests. Hence, if there is not more than $\frac{3}{4}$ of an inch or 2 cm. difference between these two measurements the pelvis is flattened. They may both be wider than normal, yet the fact that the intercristal does not exceed the interspinous by more than $\frac{3}{4}$ inch is strongly suspicious of flattened pelvis.

To measure the external conjugate. Get the patient to lie on her side with her knees drawn up and her body bent a little forward. You measure from below the last lumbar vertebral spine to the furthest point of the front of the pubic bone. To find the depression below the last lumbar vertebra in a fat woman, feel for the posterior superior spines, join them by a line and mark the skin one inch above the centre of this line. Place the tip of one limb of the calliper on this mark and the other over the centre of the pubic bone and read off the measurement. It is normally $8\frac{1}{2}$ ins., or about 24 cm.

Importance of this measurement. If this measurement is 7½ in. or less (21 cm. or less) the antero-posterior diameter of the brim is almost sure to be less than it should be. If small, take into account the other measurements. If the relation between interspinous and intercristal is normal, but they themselves are small, you may be dealing with a generally contracted pelvis; if the difference between the two is less than normal, a flattened pelvis. We say 'you may', because you do not get positive knowledge by external measurements, but you do get what is of great practical value, namely, hints that the pelvis is contracted.

When the measurements are reassuring, what to do. Stand or sit by the patient, who lies on her back, as for the fourth or pelvic grip, and push the head into the brim. If you can do this and the external measurements are satisfactory, you can assure your patient that all will be well. The most you need do, even if you cannot find the head so as to push it into the brim, is to examine her again at the end of the eighth and ninth lunar months to see that the head fits into the brim.

The head overrides and cannot be pushed into the brim, or the lie is not one of vertex, or the external measurements are unsatisfactory and abnormal. You must proceed to make sure of the true conditions, so that your patient may not incur the dangers of labour, when her pelvis will not allow a normal delivery. You find out by two methods, for both of which an anaesthetic is needed. You require one assistant who can also give the anaesthetic. Both can be done under one anaesthetic. The first method is that known as Müller's method, the second, internal pelvimetry by means of Skutsch's pelvimeter.

Müller's Method. Internal pelvimetry only tells you accurately the size of the pelvic canal. It does not tell you anything about the size of the foetal head. Müller devised his method to compare the size of the head to the pelvic inlet. To carry out Müller's method, put the patient under ether and then get her into the cross-bed position. You stand between the legs of the patient, and when her abdomen is well relaxed you pass the half of the right hand, with due care as to asepsis, into the vagina. With the left hand on the abdomen you catch the

head and press it down into the brim. If it is not over the brim you first get it over the brim by external version. Your assistant also helps you to press the head down into the brim. Your hand in the vagina will detect whether the largest diameter of the head enters the brim, and your thumb outside the vagina detects any over-riding of the pubes by the head. This is not a difficult method when the patient is under an anaesthetic, and you can get an accurate estimate as to whether the child's head will pass into the pelvis or not.

Internal pelvimetry. The patient is kept in the cross-bed position and a catheter passed. We also douche the vagina, although, if careful cleanliness is observed, it is not essential.

FIG. 127. Measuring with Skutsch's pelvimeter.

Three diameters are to be measured, namely, the true conjugate, the true transverse, and the width between the ischial tuberosities. For measuring the first two, which are

by far the more important, Skutsch devised his ingenious
pelvimeter, and so efficient is this instrument that we have
found that a doctor using the instrument for the first time is
able to get and prove accurate measurements. We will not
describe the instrument. You must handle it and learn its
use, before starting to work with it.

FIG. 128. First measurement. Skutsch's pelvimeter.

First measurement. First feel for the centre of the pubic
bone and put a cross with ink or a dermatograph pencil over

the spot. Then pass half your left hand into the vagina and feel for the sacral promontory. The true promontory is formed by the wedge-shaped piece of cartilage between the last lumbar vertebra and the sacrum. You will have no difficulty in identifying it, for you feel that the spine immediately slopes back above it; in other words, that it is the most prominent part. Push the rigid bar of the Skutsch's pelvimeter, with its point turned backwards, up to the promontory and keep it pressed against the promontory by the finger tips. Then get your assistant to put the point of the flexible bar on to the skin mark over the pubic bone, so that it just touches the skin without indenting it. Then withdraw the instrument carefully, so that the limbs are not forced apart at all, whilst you are withdrawing. Measure between the points with a rigid steel measure, either marked in inches or centimetres.

We always repeat each measurement three times. If there is any gross difference between the measurements we know that we are mistaking the promontory, but as a fact we find our three measurements are nearly always identical, or at the most differ by one-third of an inch. If there is this difference, take the average.

Second measurement. It is inconvenient to turn the rigid limb twice, so we next measure the distance from the skin over one trochanter to the furthest point of the internal transverse boundary of the pelvic brim on the opposite side. Make a cross on the skin over the left trochanter. Then bend up the patient's thighs on her abdomen and flex her legs. With the half hand in the vagina feel for the widest point of the right transverse boundary of the pelvic brim. Push the stiff limb up and hold it to this point. Your assistant then presses the flexible limb down to the skin mark, so that it just touches but does not indent the skin. Withdraw carefully, so as not to disturb the relative position of the two limbs, and measure between the two limbs. Repeat three times. This is the only measurement in which you are likely to get any discrepancy between your three measurements, both because the widest point is a little difficult to locate and you may separate the limbs in withdrawal. The

use of the shoulder on the Skutsch enables you to avoid the latter risk.　You should learn the use of the shoulder before measuring.　By its use you can widen the limbs for removal and when outside restore them to the original position.　As to the first difficulty, we rarely find that it leads to a difference of more than half an inch in the three measurements. Again take the average.

If you think the pelvic inlet is oblique or distorted, and that you are dealing with one of the rare forms of contracted pelvis, you should also measure from over the right trochanter to the left transverse boundary.
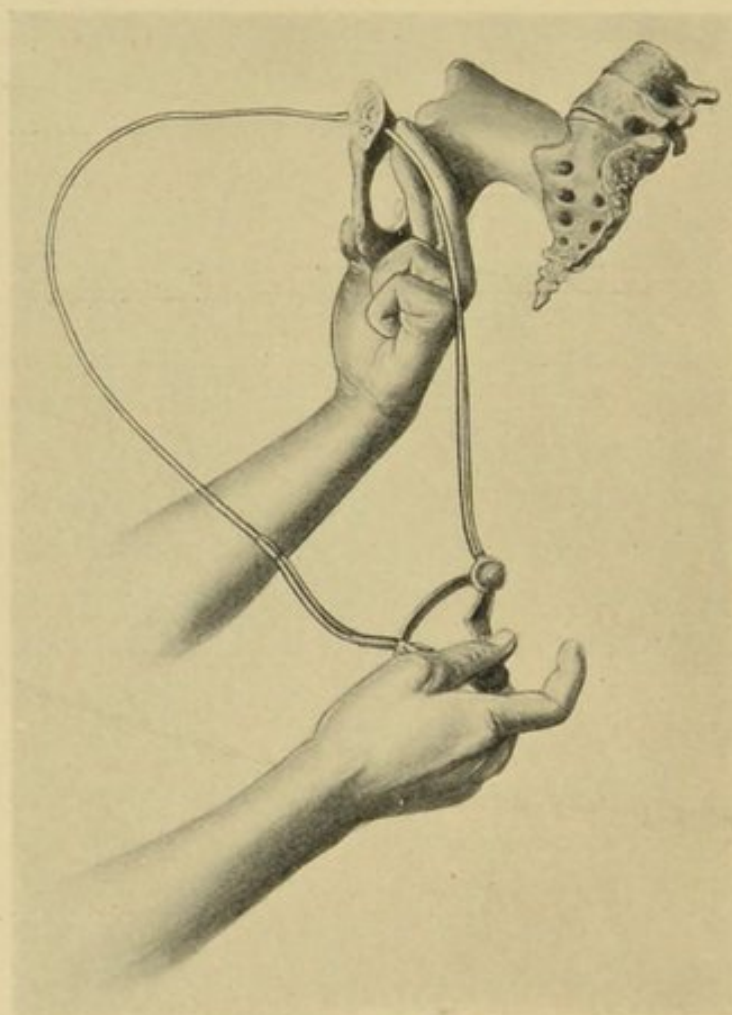
Fig. 129. Third measurement.

Third measurement.　You now turn the rigid bar round, so that its curved tip points towards the flexible limb instead of away from it.　Pass two fingers into the vagina and place

them on the back of the pubic bone. Pass the tip of the
rigid bar up to them and hold it against the back of the
centre of the pubic bone. Your assistant lightly applies
the flexible limb to the spot marked on the skin over the
centre of the pubic bone. Withdraw and measure. This
gives you the width of the pubic bone and soft parts covering
it. Repeat three times.

Fourth measurement. Again bend up the patient's thighs
and legs. Put your half hand into the vagina and feel for
the widest point of the left transverse border of the brim.
Hold the point of the stiff limb to this spot. Your assistant
lightly applies the flexible point to the spot on the skin over
the left trochanter. Unscrew, so as to make use of the
shoulder, separate the limbs a little, withdraw and measure.
Repeat three times. This measurement gives you the thick-
ness of the parts between the left transverse border and the
skin over the left trochanter.

Deductions from these measurements. The first measure-
ment gives the antero-posterior diameter of the brim plus
the thickness of the pubic bone and soft parts over it.
The third measurement gives the thickness of the pubic
bone and soft parts over it. By deducting the latter
from the former, you get an accurate measurement of
the true conjugate of the brim. The second measurement
gives you the transverse diameter of the brim plus the
thickness of bone and soft parts between the near transverse
limit of the brim and the skin over the trochanter, which
is practically level with the brim, when the woman's thighs
and legs are flexed. The fourth measurement gives the width
between the near transverse limit of the brim and the skin
over the trochanter. By deducting the latter from the former
you get the true transverse diameter of the brim.

Thus, by this ingenious instrument, you get accurate
measurements of the pelvic brim. We recommend it strongly,
for with a little practice outside the body, and understanding
how to work with it, we think you should get quite accurate
measurements in the very first case you measure.

**Measurement between the inner surfaces of the ischial
tuberosities.** There is seldom contraction at the outlet

without contraction at the inlet, which is of more importance than the contraction of the inlet. In kyphotic, and that exceeding rarity the funnel-shaped pelvis, there is contraction of the outlet over and above that at the inlet, and this measurement will tell you of it. It is not worth while having one of the special pelvimeters. Put the patient in the position she is in for the second and fourth Skutsch measurements. Then feel through the vagina the inner surface of each ischial tuberosity. Place the nail of the index finger against one and the tip of the thumb against the other. Withdraw with as little change of position as possible and measure. This is rough, but it is sufficient. Normally, the width is about four inches. If less than three inches, you may have great difficulty in getting the head through the outlet.

Rules of treatment

We have supposed that you have done all these things at the end of the seventh lunar month of pregnancy, from which time on, the child, if born alive, may be reared. You are in full possession of accurate knowledge of the case, and you have plenty of time in which to consider what is the best thing to do for your patient and the child.

Guiding rules gained from Müller's method. You can be guided entirely by Müller's method, if you succeeded in pushing the largest diameter of the head into the brim.

The rule is that on the day in which you find difficulty in pushing the head into the brim, on that day you induce labour. The head will mould and pass the brim as in normal labour.

But to find the day, you have to estimate on the first occasion how tight the fit is, and if you find it at all tight you will have to repeat the anaesthetic and the method weekly, until you find difficulty in pushing the head down. This will not in reality necessitate many anaesthetics and you can always be ready to induce labour at each examination. The reason why it does not entail many anaesthetics is that you can usually give a pretty shrewd guess as to when difficulty of descent will occur, and arrange your visit accordingly. But if your patient is nervous and timid, you may be unable to carry out this method.

You notice, too, that Müller's method tells you when to induce labour. If labour has to be induced before the thirtieth week it is really better to leave the patient till full term, if you can arrange that she be delivered by Caesarian section or pubiotomy. But for the general practitioner the induction of premature labour is still the most advisable treatment for these cases.

Rules according to measurement

Difference between flattened and generally contracted pelvis. You will have told from your measurements whether you are dealing with a simple flattening or with a general contraction of the pelvis.

The measurements which guide the following rules apply to simple flattened pelvis only. To make them apply to generally contracted pelvis add $\frac{1}{2}$ inch. Thus what is right for a flattened pelvis with a true conjugate of 3 inches is right for a generally contracted pelvis with a true conjugate of $3\frac{1}{2}$ inches. The difference is owing to the fact that, whereas in simple flattened pelvis the transverse diameter is as large as normal, in generally contracted it is smaller. The small rickety pelvis is always so small that Caesarian section alone will deliver a living child.

The true conjugate is $3\frac{1}{4}$ inches or more. Such a conjugate approaches the normal conjugate, therefore with a first child we recommend you on the whole to leave the case to full term or to induce premature labour according to the indications given by Müller's method.

If you leave the case to full term, you should prolong the first stage by keeping the patient in bed and allow full moulding of the head to take place. Remember, if the head fails to pass the brim you can make the antero-posterior diameter half an inch longer by Walcher's position (p. 275). Put on forceps if there is delay in the second stage.

If you have practised pubiotomy on the cadaver, or have confidence in your skill in doing a pubiotomy, you would do well to do it as soon as the second stage of labour has begun, or you can do it when forceps fail to deliver the child and the child is alive.

The true conjugate is between 2¾ and 3¼ inches (3¼–3¾ for generally contracted pelvis). You should *induce premature labour* according to the indications given by Müller's method. We advise Krause's method for induction of labour (see below). We do not think it worth while inducing labour before the thirtieth week. Remember again, the value of Walcher's position, whilst the head is passing the brim.

If you can arrange for everything suitable for pubiotomy or symphysiotomy at full term, getting the patient into a hospital or nursing home, the child will have much more chance of living to grow up a healthy being. The indications for the performance of these operations are described under obstetrical operations.

Krause's method. This is a simple and easy matter. An anaesthetic is not necessary. Put the patient in the cross-bed position, wash the external genitals, pass a catheter, thoroughly douche the vagina, first scrubbing with soap and water. Put in a posterior speculum and put a bullet forceps on the anterior lip of the os. Wipe the os, if you can see it, with a sterile swab wet with biniodide of mercury. Again, if you can see the os, pass the bougies by sight; if not, pass them by touch, guiding them with two fingers in the vagina. Take a urethral bougie of about No. 10 size, boil it in 1–1000 corrosive sublimate and pass it through the os. Push it as far into the uterus as possible without using force. It makes a way for itself. If you think it has not reached the fundus, but has been stopped by the placenta, withdraw it and put it in a different direction. Be careful to insinuate it gently through the internal os, so that it slips up between the membranes and uterine wall and does not rupture the membranes. Try to get three or four bougies in the uterus. If the membranes are ruptured, it is a misfortune, but you must continue the method. When the bougies are in, plug lightly round the ends that project into the vagina with iodoform gauze. Keep the patient in bed. Withdraw the bougies when labour pains are definite. Sometimes labour does not come on. If it does not come on for twenty-four hours, withdraw the bougies and repeat the whole operation with a new set and leave the patient for another

twenty-four hours. *If labour has not started*, withdraw the bougies, douche and dilate the cervix with Frommer's dilator, or better still (provided the kidneys are sound), inject $\frac{1}{2}$ oz. to 1 oz. of sterilized glycerine, by means of a boiled gum elastic catheter, into the cavity of the uterus outside the membranes. This will induce labour within three hours. It is right to add that this method has at present few upholders. It is considered dangerous, for hematuria and even death are said to have followed its use, although it must be added that deaths have been recorded resulting from every method. Our experience, however, leads us to the conclusion that it can with safety be employed provided strict asepsis is observed, air excluded from the uterus, and the amount of glycerine used be not greater than that which we have indicated. Of course, every care should be used with a view to selecting cases and excluding kidney disease, anaemia, or other debilitating condition, but with this reservation we hold that it is a safe and satisfactory procedure.

The true conjugate is from 2$\frac{3}{4}$ to 2$\frac{1}{4}$ inches (3$\frac{1}{4}$ to 2$\frac{3}{4}$ for generally contracted). Induce premature labour, if you are able to push the head into the brim any time after the thirtieth week.

If you can make preparations for Caesarian section, so much the better.

The true conjugate is under 2$\frac{1}{4}$ inches (2$\frac{3}{4}$ for generally contracted). Caesarian section is the only treatment that will deliver a living child.

IV. Signs after labour has commenced

Mechanism with flattened pelvis with vertex presentation. The principal difference between the mechanism of flattened pelvis and that of normal pelvis is that the sagittal suture, or in other words the diameter from the occiput to the front of the head, lies not in the oblique but in the transverse diameter, which is longer than the oblique. Again, if you examine a foetal skull you will find that the width between the parietal eminences (the interparietal diameter, 3$\frac{3}{4}$ inches) is greater than the width from just below one eminence to just above the other (the sub-superparietal diameter,

3-3¼ inches). Normally, the interparietal diameter lies in one oblique diameter, which is amply wide enough for it. But with flattened pelvis it lies in the antero-posterior diameter, which is 3½ inches or less. Consequently the head will have a better chance of passing if it tilts so that the sub-superparietal diameter passes. This tilting actually occurs. Usually the tilt is such that the sagittal suture, running transversely, is brought nearer to the sacral promontory. It is known as posterior asynclitism. Rarely, the tilt brings the sagittal suture closer to the pubis. This is known as anterior asynclitism. The head does not flex properly, for to flex the biparietal diameter must pass. In flattened pelvis the bi-parietal diameter 3¾ inches is hindered and the bitemporal 3½ inches advances. This means some extension. Thus it happens that in contracted pelvis you feel the anterior fonta-nelle as easily as the posterior.

Significance of mechanism. When by vaginal examination you find the vertex high up and presenting and you find the sagittal suture runs transversely, and that asynclitism is present and that you can feel both fontanelles, you know you are dealing with a flattened pelvis.

Mechanism of generally contracted pelvis with vertex presentation. The greater difficulty that the head meets with in passing the brim leads to an exaggerated degree of flexion and the posterior fontanelle presents. The head normally flexes to pass its suboccipito-frontal diameter through the pelvic brim. Here we have a general smallness of the pelvis, hence even to pass a section of the head in advance of the suboccipito-frontal section flexion is needed ; consequently, flexion is early and extreme.

Significance of mechanism. When by vaginal examina-tion you find the head high up, but the head flexed so fully and so early that the posterior fontanelle presents, remember you are most likely dealing with a case of generally contracted pelvis.

Signs common to both forms. In the early stages of labour you find *the four cardinal signs that the presenting part has not reached the lower uterine segment* and become fixed by it, namely, (1) ballotting of the presenting part, (2) sausage-

shaped protrusion of membranes through the os, (3) no presenting part is reached by two fingers in the vaginal, (4) empty cervical canal, which hangs down like a curtain.

Malpresentations. In reading the malpresentations you noticed that contracted pelvis is a cause of any one of them. Therefore, whenever you get a malpresentation in a primipara, or a multipara with a history of difficult labours, it is more than probable that you are dealing with a case of contracted pelvis.

Pendulous abdomen. In a primipara a pendulous belly at full term means that the head cannot reach the lower uterine segment, and a contracted pelvis is by far the most probable cause.

Early rupture of the membranes. The unsupported bag of membranes frequently ruptures early, long before full dilatation of the os. The effect is disastrous. The os dilates slowly, the waters drain away, and the child is directly pressed upon by the contracting uterus; in short, the symptoms described as threatening rupture of the uterus arise. In other cases the pains slack off after rupture of the membranes, i. e. uterine inertia supervenes.

Rupture of the uterus. Contracted pelvis, leading to obstructed labour with the signs described under 'Threatening rupture of the uterus', is the commonest cause of ruptured uterus.

V. What to do when labour has begun

Before rupture of the membranes. It is most unlikely that you will have a Skutsch's pelvimeter with you, but you may have time to send for it. You may also have time to read up the rules, which are difficult to remember.

If you have no time you want to get some estimate of the true conjugate, and this you do roughly by measuring the diagonal conjugate.

Measuring the diagonal conjugate. Pass the index and middle finger of one hand up to the sacral promontory. Should you be unable to reach it, the diagonal conjugate is longer than your fingers and any contraction present is probably slight. Press the radial side of the index finger up against

the pubic arch. Then press a finger of the other hand at right angles to the radial border of the index finger as close to the pubic arch as possible and mark the skin with the finger nail. Withdraw the fingers and measure across the back of the fingers from this mark to the tip of the middle finger. This is the diagonal conjugate. By deducting half an inch you get the true conjugate approximately, for the actual difference depends on the inclination, depth, and thickness of the pubic bone. But for practical working purposes, this measurement is very uncertain. Again, with your half or whole hand in the vagina, feel round the pelvic brim and estimate roughly its size. By trying to spread out the hand, first in the antero-posterior and then in the transverse diameter, you can gauge to some extent these diameters, for you can remove your hand in the position in which you held it and measure across the fingers.

If the head presents, attempt to push it into the pelvic cavity, as you do in Müller's method.

Having roughly gauged the amount and nature of the contraction in this manner, you have to decide what to do. The measurement rules already mentioned come to your aid.

The true conjugate is over 3¼ inches. Let the case alone until rupture of the membranes.

The true conjugate is between 2¼ and 3¼ inches (2¾ and over in generally contracted). Again you let the case alone until the membranes rupture.

If you have confidence in your operating powers, you can do a pubiotomy at the beginning of the second stage.

The true conjugate is under 2¼ inches (under 2¾ in generally contracted). You must set about making preparations for Caesarian section. Its danger to the mother should be less than attempts or success in dragging a crushed child through so small a pelvis.

The membranes have ruptured.

The pelvis is big enough for you to get your whole hand past the brim.

(*a*) **If the head presents.** Leave the patient alone in bed

as long as there are no signs of distress. This will allow time for the os to dilate and the head to mould. If the head attempts to enter the brim and the os is open, put the patient in Walcher's position, keeping her lightly anaesthetized the while with chloroform, or better, give her morphia gr. $\frac{1}{4}$ to $\frac{1}{2}$ hypodermically.

Walcher's position. The patient lies on her back with her hips projecting over the edge of the bed and her legs and thighs hanging down by their own weight. The feet must not touch the ground, or this extension does not occur. Sometimes the bed is not high enough. If so, you must raise it by putting blocks or big books under the legs. Walcher's position is painful to maintain and that is why light chloroform anaesthesia, or morphia sufficient to keep
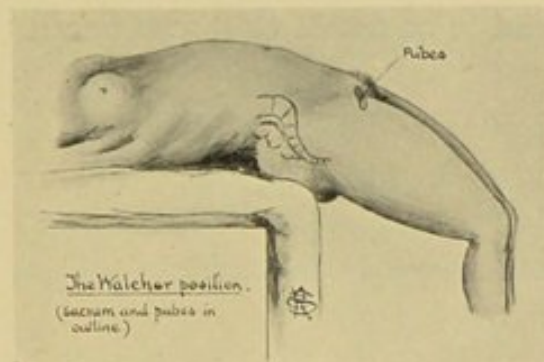
Fig. 130. Walcher's position.

the patient still, is necessary. The weight of the lower limbs rotates the pelvis on the sacro-iliac joints so that the pubic bone sinks. In this way the true conjugate is actually lengthened by half an inch, and this addition is of the greatest value.

At the same time press the head down into the brim.

When the head has descended into the pelvic cavity and its largest diameter is engaged in the brim, get the patient out of Walcher's position. If labour has been prolonged, put on forceps and deliver.

If the head does not descend in spite of Walcher's position. If the head does not descend, you may, in spite of contra-

indications, try forceps in a tentative manner, for you may succeed, but do not drag and pull too hard. If you fail you will have to do a pubiotomy, if you want to save the child's life. Otherwise you will finally be driven to perforation.

(b) **If a malpresentation is present.** Turn the child and bring down a leg.

When the time comes for the passage of the child's head past the brim, give the patient chloroform and put her in Walcher's position. When the head has passed the brim, take her out of Walcher's position.

You can always tell if the child is dead or alive by feeling for the pulsation of the cord. If it is dead and you have difficulty in delivery, perforate the after-coming head.

The membranes have ruptured.

The pelvic brim is so small that you cannot get your hand past it.

The true conjugate is probably under $2\frac{1}{4}$ or 2 inches. In such a case you will probably have difficulty in dragging a crushed child through the pelvis, and the somewhat desperate undertaking of Caesarian section is really the safer.

When symptoms of threatened rupture have arisen. You must deliver at once by perforation, decapitation, or embryotomy as the case may be.

If the true conjugate is under $2\frac{1}{4}$ inches you may have to run the risk of Caesarian section rather than that of attempting to cut up and deliver the child, for when the pelvis is as small as this, perforation and embryotomy are exceedingly difficult, for you cannot get your hand up to the foetus and tell what you are doing. Caesarian section, desperate though it is, is probably easier and safer in these extreme cases of contraction.

Sequelae occurring in the puerperium after difficult cases of contracted pelvis. The vaginal and intra-uterine manipulations increase the liability to sepsis as in other labour cases where they have to be carried out.

In cases of contracted pelvis, however, there is a liability

for either urinary or faecal fistulae to appear from the third
to fifth day after delivery of the child. During the pro-
longed and obstructed labour, the compressed tissues between
the child's head and the bony rim of the pelvis are de-
vitalized. A slough separates in a few days. In front, the
cervix or vagina and the base of the bladder are compressed,
and a cervico-vesical or vagino-vesical fistula results; behind,
a similar utero-, cervico-, or vagino-rectal fistula results.

The treatment of these fistulae belong to gynaecology.

SYNOPSIS OF TREATMENT OF DIFFICULT DELIVERY OF THE BABY

1. Ask for the *history of previous labours*. When you go
to a case of labour you always ask for the history of previous
labours. If the patient has been delivered of a live child,
there cannot be any marked degree of contracted pelvis.

2. Ascertain whether the patient is in labour or not.
Remember you can often get one finger into the os of a
multipara in the later months of pregnancy. Then diagnose
or try to diagnose the lie by abdominal palpation.

3. If the patient is in labour, the cardinal signs that some-
thing unusual is present are (1) ballottement, or absence of
presenting part, (2) sausage-shaped bag of membranes which
bulges with the pains, (3) the cervical canal is empty and
hangs down, (4) no presenting part is felt by two fingers
in the vagina.

What to do if these signs are present. It is essential in
a primipara, or in a woman who has had difficult labours
and stillborn children, to find out whether any contraction of
the pelvis is present or not.

To do this, if you have a Skutsch so much the better. If
you have not, you should pass your whole or half hand into
the vagina. You can do this without an anaesthetic in most
multiparae, but in primiparae you must first give chloroform.
You must explain to her the need of ascertaining as early as
possible the conditions present. When ready, first measure
the diagonal conjugate (p. 273). If your two fingers do not
reach the sacral promontory although you press them up-

wards, the diagonal conjugate is longer than your fingers, and but little contraction can be present.

With your whole or half hand you estimate if there is any contraction or not, and whether you will or will not have to treat the case as one of contracted pelvis. If there is no contracted pelvis, or obstructing tumour, you use your half or whole hand to diagnose the presentation.

The history of previous labours or the examination with the half hand, &c., tell you that no contraction of the pelvis is present. What to do when the four cardinal signs are present. You can safely let your patient alone in bed until the membranes rupture, except in the case of hydramnios. But you should be present when they do rupture, for fear of prolapse of the cord.

When the membranes have ruptured. If you have not previously made the diagnosis by abdominal palpation and vaginal examination, you must do so now. Pass your whole or half hand into the vagina, giving the patient chloroform, if necessary.

Breech and face you can leave, and let them descend into the pelvic cavity. In the case of cross-birth, brow, hydrocephalus or monster, you turn and bring down a leg.

Cases in which face, breech, or vertex pass the brim, and then further progress stops some time before complete delivery.

General reasons. 1. The os may be dilating slowly owing to cicatricial tissue in its substance or early rupture of the membranes.

2. Uterine inertia may be present.

In these cases you make the patient sleep. You only open the os when signs of distress of mother or child begin. If the patient has uterine inertia, when she wakes, and conditions are favourable for delivery, deliver.

Face. Special reasons. Progress of the face stops, because the chin is turned backwards. Make the patient sleep, so that when she wakes her pains may be stronger, and turn the chin to the front.

Breech. Special reasons. The breech is impacted, either because the arms are extended or one arm is behind the neck,

or the foetus is a monster.   Put your half or whole hand into the vagina for diagnosis.   Remember the possibility of locked twins.   Treat according to the condition you find.

Vertex.   Special reasons.   The vertex passes the brim and reaches the pelvic cavity, but then further progress ceases. Remember that a kyphotic pelvis does not cause obstruction at the inlet, but does at the outlet.   You would in such cases put on forceps and pull.   If moderate force fails to make the head progress, put your whole hand into the vagina, passing it up posterior to the head and diagnose the condition present.   The case may be one of locked twins, in which the head of the second child is jammed into the neck of the first ; or a monster with enormous shoulders, hydrothorax or other deformity ; or the arm may be prolapsed by the side of the head.   If any of these are present, treat according to the rules already laid down.   In the absence of these conditions remember that you may have put on forceps too early, before the largest diameter of the head has fixed in the brim.   If this is not so, pull harder.

Signs of threatening rupture of the uterus are present. You must deliver as rapidly as possible, either by forceps, perforation, fillet on the breech, embryotomy, or decapitation, as the case may be.

CHAPTER XIII

ABNORMALITIES OF THE THIRD STAGE

Retained or Adherent Afterbirth—Post-partum Haemorrhage—Inversion of the Uterus

For the purpose of this section the third stage includes the period from the birth of the child to the delivery of the placenta and the stopping of haemorrhage.

RETAINED AND ADHERENT AFTERBIRTH

The methods by which the placenta separates from the uterus and is expelled into the vagina, together with the signs which show that it has been expelled into the vagina, have been already given under the conduction of normal labour. There we said that we base our practice mainly on the notion that the placenta is separated by a post-placental haematoma. On account of this, in practice we only sink the hand just above the fundus, but do not rub or massage the fundus. Rubbing the fundus and squeezing it before the placenta has left the uterus is directly harmful, for (1) it may squeeze out the post-placental haematoma, which is separating the placenta from the uterine wall, (2) it causes irregular contraction of the uterus, which does not separate and expel the placenta as efficiently as the contractions of the uterus, when it is left to itself.

Frequency of manual removal of placenta. In the last 5,630 cases at the Rotunda, the placenta has been manually removed 82 times, or 1 in 69.

Causes: I. Retention.

1. When chloroform has been given, the expulsion of the placenta from the uterus is often prolonged.

2. The feeble uterus of uterine inertia takes longer than normal to expel the placenta.

3. Early squeezing of the uterus with expulsion of the post-placental haematoma leads to retention.

4. Irregular uterine contraction, due either to injudicious kneading of the uterus, a full bladder, or some unknown cause, fails to expel the placenta. Hour-glass contraction is a common cause of retention of the placenta. The placenta is in the fundus, which is thin, whereas the uterus below the placenta is thick and hard.

II. Adhesion.

1. The placenta itself is adherent.

2. Adhesion of the membranes.

Diagnosis. When the placenta is still in the uterus an hour after the delivery of the child, we look upon the case as one of retained or adherent placenta. If the patient has had prolonged chloroform, we wait for two hours. You cannot say what the cause is until you have had your hand in the uterus. Retention is much more common than actual adhesion.

Treatment. If there is bleeding which is in excess of the normal and affects the patient, the case becomes one of post-partum haemorrhage, and the removal of the placenta is essential.

In an ordinary case, in which there is no alarming haemorrhage and the pulse is steady, our rule is to let the patient alone for one hour. We rarely leave them longer, for we find that shock or collapse is liable to occur if the placenta is left in the uterus for longer than an hour. At the end of an hour, then, we rub up the uterus to a hard contraction and try to express it. We stretch the cord at the same time to see if it lengthens. If it does, we wait for another pain and again try to express the placenta. If we fail, our treatment then depends on the condition of the patient and whether her uterus is the feeble one of inertia or has been rendered sluggish by chloroform, in which case we wait another half to one hour and try again. If we fail again we remove the afterbirth with the hand.

Manual removal of the afterbirth

Anaesthesia. The question of an anaesthetic depends largely on your patient. The manual removal of a retained

placenta is not painful. But the removal of an adherent placenta is painful. Unless our patient is nervous, we try at first tentatively without an anaesthetic.

Preparations. The aseptic precautions for manual removal of the placenta must be especially thorough. There is no rush of liquor amnii to flush away any germs you carry into the parturient canal. Again, you are directly rubbing over the area where septic organisms are most likely to be implanted, namely, the placental area. Therefore get your patient into the cross-bed position, wash your hands and her external genitals with soap and water thoroughly, then wash off the soap by pouring a small jug of warm water over the parts. Then wash the inner surfaces of the labia minora with soap, wash off the soap and put a piece of wool soaked in biniodide between the labia and leave it to thoroughly disinfect them. Then again wash your hands with a boiled nail brush for three or more minutes and put on boiled rubber gloves. Empty the bladder with a catheter. Douche and scrub out the vagina thoroughly. Lubricate one hand with soap and pass it up into the uterus.

Removal. The first difficulty you may meet with is hour-glass contraction. By putting your fingers in a cone and pressing upwards, at the same time steadying the uterus with your other hand on the abdomen, you will gradually overcome this. Then separate the afterbirth. To do this, get your fingers between the membranes and the uterine wall, and keeping along the uterine wall sweep the fingers round the whole uterus between the afterbirth and uterine wall. Catch the placenta and pull it away. If it comes away entire in this way, you can be content, only examine the afterbirth carefully to see that it is entire.

If it does not come away as easily as this, there is some adhesion between it and the uterine wall. We then advise you to take off the glove and soak your hand for two minutes in biniodide (1–1000). Then push your more sensitive, ungloved hand into the uterus. Again, get between the membranes and the uterine wall, if you can, and separate the placenta by pushing your fingers up between it and the uterine wall. Sometimes it is so adherent that you have

to scrape it off, steadying the uterus the while with your hand on the abdomen. Pull away the placenta. But this is not sufficient. We advise you to put your hand up into the uterus again and again, until you are satisfied that every bit of the afterbirth has been pulled away. Bits of membrane do not matter very much, for they come away in the lochia in a few days in most cases. But do not leave any membrane if you can help it, for it forms dead material on which organisms may grow and cause intra-uterine sepsis. By
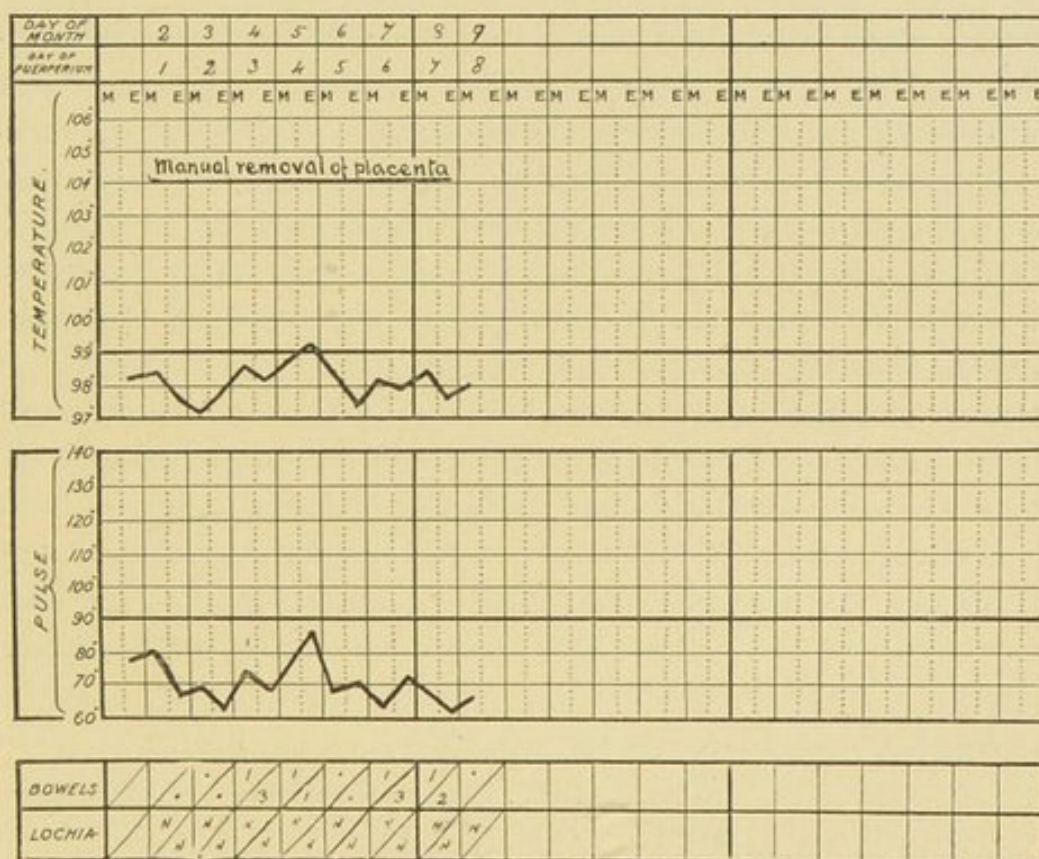
Fig. 131. Temperature chart after manual removal of placenta.

taking a ball of iodoform gauze in your fingers and rubbing the uterine wall with it, you will succeed in detaching adherent membrane. We now in difficult cases use gloves, from which the tips of the four fingers have been removed, to permit our finger tips to work with greater effect. The hands are sterilized as well as possible and our nails are painted over with 'New Skin' after the glove is on and before they enter the uterus.

After you have removed the afterbirth, give a hot intra-uterine douche through the large Bozemann's catheter to thoroughly wash the uterus.

POST-PARTUM HAEMORRHAGE

Of all conditions met with in the parturient woman, none is more urgent and more immediately dangerous to her life than post-partum haemorrhage; nor is there any condition which depends so greatly in its issue on the skill and promptness of the medical attendant.

Varieties. Post-partum haemorrhage is divided into primary and secondary. Primary refers to haemorrhage that occurs within the first six hours after the birth of the child, and secondary to haemorrhage that occurs later than this. Secondary haemorrhage is nearly always due to the same thing, namely, the retention of some piece of afterbirth in the uterus. The treatment is the same as for primary haemorrhage. Hence, this arbitrary distinction between primary and secondary will not again be mentioned.

Distinctions. Blood flows either from the placental site, from some laceration of the parturient canal, or is effused into the tissues of the vagina and vulva, resulting in a haematoma vulvae. We deal with these in the reverse order.

Haematoma vulvae. This is not a common form of post-partum haemorrhage. Sometimes a haematoma forms before the birth of the child. What you notice is that the labia begin to be distended by a tense blue swelling. It may get no larger, or the patient may get very pale and show all the symptoms of loss of blood, whilst the swelling gets very large and may even burst and bleed externally.

Treatment. If it is small, let it alone. The blood will probably absorb. If after watching it for an hour or more it continues to increase in size, and also whenever the woman's pulse begins to rise or other signs of loss of blood appear, incise it, let out the blood and pack it with iodoform gauze. Remove the plug after twenty-four hours and let the parts fall together. If the haematoma suppurates, treat as an abscess.

In the rare cases where it forms before labour, deliver quickly. If it obstructs delivery by its size, incise, deliver, and plug with gauze.

See that the bladder is emptied by a catheter every six hours as long as the cavity is tightly plugged.

Traumatic post-partum haemorrhage. The cervix, the vagina, the perineum, and the bulb, may all be torn and more or less profuse haemorrhage occur. Haemorrhage from the cervix will very rarely be so severe or continuous that you have to stitch the tear, but you may have to do so. Laceration of the vagina very rarely leads to much loss of blood. A tear of the perineum sometimes exposes vessels which continue to spout. Finally, a tear into the bulb at the side of the clitoris may result in a very dangerous haemorrhage.

How to diagnose between traumatic and placental-site haemorrhage. Remember that bleeding from the placental site is much more common than severe bleeding from a laceration. In bleeding from the placental site, the reason that there is bleeding is that the contraction and retraction of the uterus is defective. The cause of this defect may be mere feebleness, more frequently it is due to retention of a piece of afterbirth or blood clot, or to a full bladder. But whatever be the cause, the striking feature is the absence of proper retraction and contraction, and when you feel the uterus, you find that it is large, soft, and flabby. When it does contract, either of itself or because you rub it and squeeze it, blood and blood clots are squirted out by its contraction. This is quite different to the bleeding from a laceration. In this case the uterus is not large and is hard and retracted. Yet in spite of this good condition of the womb, there is a free and continuous flow of blood. Again, when in the case of haemorrhage from the placental site the uterus contracts, the blood is squirted out, but the haemorrhage then ceases, whilst the uterus refills. When the haemorrhage is traumatic in origin, a contraction of the uterus does not appreciably affect its flow. Briefly, then, continuous haemorrhage is traumatic, intermittent is from the placental site.

How to diagnose the situation of the bleeding laceration. Treatment. If the uterus is found to be hard and there is

a free flow of blood, put the patient in the left lateral position and see if she has a bad tear of the perineum or bulb of the clitoris. If so, quickly stitch the tear. If you are not sure that the bleeding comes from the perineum or bulb of the clitoris, wash the vulva, turn the patient into the cross-bed position and douche out the vagina with water so hot that it is uncomfortable when it flows over the forearm. Very often this hot douche temporarily and sometimes permanently stops the haemorrhage. Whilst the fluid is flowing, open the perineum and see if blood is flowing from it. This is not easy, for the flow of the douche obscures your view. By pinching the tube you can stop the flow and then you can see. If it is bleeding, stitch it at once. Then examine the bulb similarly on either side and stitch it, if the bleeding comes from a laceration there. If the bleeding is not coming from the perineum or bulb, hold the vulva open with your fingers and see if the vagina is lacerated. A vaginal laceration is usually due to a blade of the forceps. The hot douche suffices to stop vaginal bleeding. Finally, feel the cervix with two fingers. You will be able to feel a laceration, and if your fingers are ungloved, you feel the warm blood flowing over them. The hot douche nearly always stops bleeding from a torn cervix, but sometimes you may have to stitch the cervix.

Stitching the perineum has already been described.

How to stitch the bulb of the clitoris. Take a medium, fully curved needle, armed with either catgut or salmon gut. Enter the needle a quarter of an inch internal to the inner side of the tear. Plunge the needle deeply into the tissues until it touches the pubic bone, then sweep it round and bring it out a quarter of an inch external to the outer edge of the tear. Put in as many sutures as you think necessary. The urethra is well out of the way, if you direct the needle towards the pubic bone. If the stitch is not inserted deeply, the surface only of the wound is brought together, and the woman bleeds into her own tissues. Watch for this. If a haematoma occurs, see if it increases hour by hour. If it does so, open it, empty it, and plug tight with iodoform gauze. Remember, if you plug, to pass a catheter when necessary. It is difficult to

keep this plug in position. The best way is to plug with gauze, cover this with an inverted pyramid of lint and keep the dressings on with a tight T bandage.

How to stitch the vagina. Open the vagina with the fingers. Stitch with a small curved needle and interrupted catgut sutures, taking in the whole depth of the wound.

How to stitch the cervix. If the douche stops the bleeding it is better not to stitch the cervix, for after labour it is swollen and oedematous, and unites badly. In rare cases, however, you may have to stitch the cervix to stop the bleeding.

Pass up a small, fully curved needle, armed with stout catgut, on a long needle-holder. Guide it by two fingers in the vagina to the cervix. Pass this suture through either swollen lip of the cervix. Pull the cervix down with this suture—it tears less than a bullet forceps—out of the vulva. Then sew up the rent by sight with catgut sutures. This method was first described by Veit, and we have found it satisfactory.

Post-partum haemorrhage from the placental site. The reason why bleeding takes place from the uterus is that the normal processes by which the uterus stops haemorrhage are lacking or inefficient. It is important to understand how bleeding is prevented in a normal case.

Natural means by which haemorrhage is prevented. The placenta forms, as it were, the inner wall to the placental area, where the uterus is riddled with large blood vessels and sinuses. Any bleeding which occurs flows from these torn sinuses, which are exposed by the peeling off of the placenta. There are three ways by which the bleeding is stopped naturally :—

1. By contraction of the uterus.
2. By retraction of the uterus.
3. By clotting of blood.

The corkscrew twist of the uterine arteries and V-shaped bend of the uterine veins also add to the efficiency of contraction and retraction.

Nature and importance of retraction. Retraction is a quality of uterine muscle that occurs separately from contraction. We can be sure that this is so, for when in doing

Caesarian sections we come to stitch up the uterus, we can notice that the muscle wall thickens, although it may remain flabby. Moreover, when this thickening of the wall occurs, bleeding from the cut uterus either lessens or ceases altogether.

The uterus contracts and relaxes, but retraction is a permanent quality of the uterine muscle both before and for some time after the birth of the placenta. In a normal case there is little and sometimes no haemorrhage; it is this peculiar quality of the uterine muscle, the power of continued retraction rather than intermittent contraction, that stops haemorrhage. Therefore you sometimes come across cases in which the uterus fails to contract and harden, as you would wish, and yet there is no bleeding. In these cases retraction, a quality independent of contraction, stops the bleeding.

At the same time a hard contracting uterus signifies a uterus that is not exhausted, and one in which both contraction and retraction are efficient. When, therefore, you lay your hand on the uterus, after the birth of the placenta, and find it hard and contracted, and that it remains firm, you know that bleeding cannot occur from the placental site.

Causes of post-partum haemorrhage from the placental site. The causes are—

1. Inherent inefficiency of the uterine muscle. This is rare. Even after marked primary uterine inertia, the retraction may be strong enough to prevent excessive haemorrhage, although contraction is very feeble. Haemorrhage due to this cause is known as atonic haemorrhage.

2. Secondary uterine inertia. The tired and exhausted uterus fails to retract and contract. This is a very important practical cause, for owing to this danger of post-partum haemorrhage, it is dangerous to deliver a woman whose uterus is in the condition known as secondary uterine inertia.

3. Anything within the uterus, namely, the whole or part of the placenta, membranes, or a large blood clot, interferes with retraction or contraction. *This is by far the commonest cause of post-partum haemorrhage.*

4. A tumour in the wall or a full bladder interferes with contraction, and more especially retraction. *Full bladder must be always remembered as a cause of bleeding.* It is

a simple cause, readily remedied, yet frequently overlooked. Haemorrhage due to the last three causes is called pseudo-atonic haemorrhage.

5. General diseases, such as haemophilia, Bright's disease, which carry with them a tendency to bleed freely.

Signs and symptoms. A certain amount of haemorrhage accompanies the third stage in all cases. The average is said to be under a pint. The haemorrhage that is called post-partum haemorrhage may be defined as that amount of loss of blood which causes constitutional symptoms in the patient and makes her ill. Sometimes a very little bleeding results in constitutional symptoms. In these cases, doubtless, shock (nervous inhibition) is a more important factor than collapse (loss of fluid). For example, in some cases the pulse, instead of being the small, rapid pulse of haemorrhage, is the low tension, slow pulse of shock.

The two conditions are so closely united from the practical point of view that they may be considered as one and the same. In both the patient becomes pale and weak. She lies back in a relaxed condition. Her breathing is quick and shallow, her lips blanched, she is thirsty, she may be sick. In severe cases she is anxious, restless, and tries to get up from the bed. She is conscious almost to the end.

Treatment. The first thing to do in treatment is to stop the haemorrhage, whether you think the patient's symptoms are due to the amount of blood lost or the superimposed shock. It is so difficult to gauge the amount of illness due to shock and the amount due to collapse, that we advise all these cases to be treated on the same lines.

Haemorrhage occurring before the delivery of the after-birth. In these cases treatment is clear, namely, to rub up the uterus and express the afterbirth. If you fail to express it, remove it by the hand. Sometimes the blood comes away in a sudden large gush, so that you must act quickly and stop the rush of blood. Put your hand into the uterus and remove the afterbirth. Plunge the hand in again and knead the uterus, between your intra-uterine hand and your other hand on the abdomen, until it contracts. Then give a hot intra-uterine douche.

In the case of sudden and severe outpouring of blood, you sometimes have to put an unwashed hand into the uterus. Do not fear to do so. You have to stop the severe haemorrhage promptly or your patient will die. At the same time
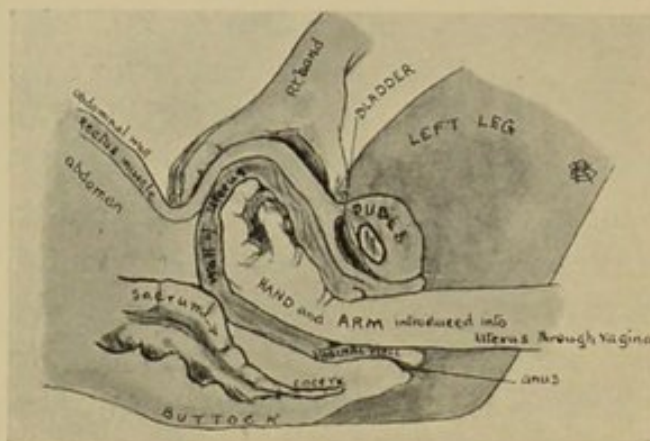
Fig. 132. Bimanual kneading of the uterus.

the knowledge that you may have to do this emphasizes the value of having a boiled glove handy.

Haemorrhage occurring after the delivery of the afterbirth. Urgent cases with a rush of blood. You must here adopt the same treatment as in cases when the afterbirth is still in the uterus. You plunge your hand into the uterus, clear out any remnants of afterbirth, and pommel and knead the uterus bimanually until it hardens. Then give a hot intrauterine douche, or, better still, give the hot douche first.

Cases that are not of extreme urgency. The majority of cases are of this nature. The bleeding does not stop, but the patient gradually becomes pale and her pulse quickens.

Our order of treatment is as follows, the patient being on her back. First seize the uterus with the left hand on the abdomen and rub it up to a contraction. You are then able to tell for certain whether the blood comes from the placental side or a laceration. With the right hand take a catheter, and, the patient being on her back with her knees drawn up and separated, pass the catheter down to the urethra hugging the under surface of the pubic arch. In the majority of cases it slips in to the bladder. If it does not, and the uterus does not harden quickly, waste no more time.

Get the patient quickly into the cross-bed position. If bleeding is at all alarming, do not waste time by cleaning the vulva. The douche has already been prepared for emergency and the nurse has filled it up with hot water from the kettle, until the douche fluid of creolin (℥j to Oj) is uncomfortably hot to the skin.

Put on the vaginal nozzle, and douche out the vagina, and, whilst douching, pass the catheter by sight, if you failed to pass it before.

If the bleeding still continues quickly remove the glass nozzle and put on a large Bozemann's catheter. Pass this into the uterus. Guide the catheter with two fingers in the vagina, and douche out the uterus with very hot fluid, even letting it burn the patient slightly. If this douche stops the bleeding continue it for a little while. Then carefully examine the afterbirth. If it is entire be content. If a piece of placenta or membrane has been left behind in the uterus, it is better to remove it at once, and again douche the uterus.

The douche fails to stop the haemorrhage. Put the hand into the uterus and remove any piece of membrane or placenta that you feel. Repeat this, until you are sure the uterus is empty, as in manual removal of the placenta. If the membranes are very adherent, roll up a ball of gauze and wipe over the uterine wall with this. You will get the membrane away in strips by this means. If the bleeding continues, knead the uterus bimanually until it contracts. When it does so, its contraction is often so powerful that its grip on the hand is painful.

If intra-uterine kneading does not stop the bleeding. You are dealing with a case of exhausted or diseased uterus, that has lost the capacity to retract or contract. You are then driven to your last expedient, namely, packing the uterine cavity with iodoform gauze. For this purpose nothing is more convenient than Dührssen's tin of sterilized iodoform gauze, and we advise you always to carry one of these in your bag.

This gauze is six yards long and three inches wide. Take the end of it in your hand and carry it up into the uterus. Push it into the uterus bit by bit, until all is in the uterus, except a small piece which hangs out of the cervix. You

can use plugging forceps, if you like, but we find the hand more efficient. After you have plugged the uterus, take the sterile wadding, which you also find in Dührssen's tin, and pack the upper vagina with it. At one time this treatment met with condemnation mainly on theoretical grounds, which were that the amount of material required to plug an atonic uterus would be enormous, but experience has proved its value. We have found it is easy to do, and it always stops the bleeding. We would insist on the fact that the uterus, however flaccid, invariably contracts on the gauze when introduced into its cavity, thus the quantity of plugging required is usually very small, and the result immediately satisfactory. Remove the plug after twenty-four hours.

Ergot. We have omitted the giving of ergot, not because ergot is not good, but because these other measures are far more important. It is no good giving drugs by the mouth to collapsed patients. Either absorption is very slow or the patient is made sick. Give, as soon as you have time, ergotinine citrate (gr. $\frac{1}{25}$) as a hypodermic injection deeply into the buttocks. Ergotinine is always injected deeply into muscles, for if injected superficially an abscess is apt to follow.

Ergot does two good things—(1) it tends to make the contractions of the uterus tonic, (2) it makes the muscles of the arteries contract, and raises the blood pressure. This is a good action, for the blood pressure in shock and collapse is very low.

Other methods of stopping severe post-partum haemorrhage. (1) By compression of the aorta. You certainly can stop severe bleeding by direct pressure on the aorta from the abdomen. We have used this pressure in urgent cases, when things were not ready.

(2) Pull the fundus of the uterus down towards the pubes, and sink a large pad deeply into the abdomen above the fundus to keep the uterus acutely anteflexed. Keep the pad on by a tight binder. This is said to always stop bleeding. It is a good way to give you time, but is very painful to the patient.

After the bleeding has been stopped. You have now to treat the collapse and shock. A full account of this treatment

has been given under ante-partum haemorrhage (pp. 127–30). Adrenalin chloride (ɑ) v) hypodermically is also advised as a means of raising the blood pressure, and it seems to do good. For the rest, you will have to stay by your patient until the fear of further haemorrhage and secondary collapse is past.

Summary of the treatment of post-partum haemorrhage

If very urgent either compress the aorta or plunge the hand into the uterus, remove the afterbirth or remnants of afterbirth, if any, knead the uterus between the intra-uterine and abdominal hands until it contracts, and then give hot intra-uterine douche and ergotinine gr. $\frac{1}{25}$.

If not so urgent proceed in the following order if the bleeding fails to stop :—

1. Rub up the uterus and make it contract, thus deciding whether the haemorrhage is traumatic or non-traumatic in character.

2. Pass a catheter.

3. Hot vaginal douche.

4. Hot intra-uterine douche.

5. Manual exploration of the uterus, with removal of any remnants of afterbirth or blood clot, followed by—

6. Intra-uterine kneading of uterus.

7. Plugging the uterus with iodoform gauze when bleeding has stopped.

8. Ergotinine citrate (gr. $\frac{1}{25}$) into the buttocks.

9. The treatment for the restoration of the patient from collapse.

10. Long watching by the bedside for fear of further haemorrhage or secondary collapse.

INVERSION OF THE UTERUS

The sudden turning inside out of the uterus is extremely rare.

Causes. It is known to have followed pulling on the cord, pressure on the fundus, and is said to have followed precipitate labour. It may occur without perceivable reason. To occur at all, the uterus must be in a partially atonic condition.

Result. Great shock, which remains as long as the uterus is inverted. Haemorrhage probably will be severe.

Diagnosis. Sudden shock of the patient leads you to examine her. In palpating the abdomen you find either that the uterus has disappeared or that the fundus has dipped down, like a cup. Sometimes you can see the uterus when the lips
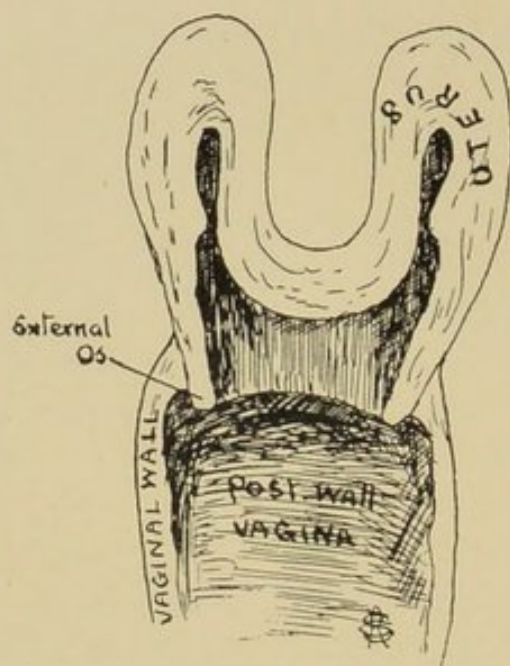
FIG. 133. Partial inversion of the uterus.

of the vulva are opened. Sometimes it comes right outside. By vaginal examination, you feel the rounded tumour. You cannot pass your fingers through the cervix into the uterine cavity, but you can pass them round the circumference of the tumour.

Treatment. Use the whole hand to push the uterus back. If the placenta is adherent, push the uterus back and then separate the placenta. If this is impossible, peel off the placenta and then push the uterus into its proper shape and position. To push back the uterus, you have to reduce it, in much the same way as you reduce a hernia. Squeeze the fundus with all the fingers and at the same time push it upwards.

Another method is to pass your finger into one groove at the side of the uterus and push upwards, and then into the other groove and push upwards. You, in this way, reduce the inversion bit by bit.

SUDDEN OR RAPID DEATH AFTER CHILDBIRTH

1. **Haemorrhage** is the most common cause.

2. **Shock,** by which is meant some profound nervous depression, whether it lead to vaso-dilation, syncope, or other physiological change.

3. **Pulmonary embolism.** An embolus plugging some part of the pulmonary artery leads in most cases to death. It may occur any time after the child's birth up to late in the puerperium. Death itself is rarely sudden. The onset of the condition, however, is terribly sudden.

Signs and symptoms. The sequel of events is usually as follows. The mother is suddenly seized with a violent pain in the chest and dyspnoea. She falls back, if she is sitting up or in any way exerting herself, and begins to gasp for breath. Her chest heaves convulsively, her face is livid and pale. She urgently demands that the window be flung open so that she may have air. The pulse is rapid or cannot be counted.

If you listen to the chest, you may find that no air is entering the greater part of the affected lung.

After a short or long struggle the patient sinks into unconsciousness, in which state she may remain for several hours before death or recovery.

If she recovers, dyspnoea is apt to return with slight exertion. She may have a series of similar attacks resulting eventually in death or recovery.

Treatment. The damaged lung cannot be put to work again. All you can do is to give free access of air and free use of the respiratory muscles. Open the windows and doors of the room. Take all weight of the clothes from the patient's chest. The sitting position with fixed arms is the best respiratory position, but the patient as a rule chooses her own position. Give nothing by the mouth, for a gasping patient is likely to choke. Give a hypodermic of strychnine (gr. $\frac{1}{20}$) and repeat this two-hourly for three doses.

It is scarcely likely that you will have a cylinder of oxygen at hand. If you have, let a very gentle stream play over the patient's face.

4. **Air embolism.** Aspiration of air into the uterus and its entry into the veins is said to cause death. Many of these cases have been shown to be due to the formation of gas in the blood after death by the bacillus aerogenes capsulatus. There is a good deal of scepticism on this question of air embolism, though in rare cases it seems to have been the cause of death.

5. **Sudden emptying of a uterus distended by hydramnios.** This has been a cause of sudden death. Possibly the reason is the removal of pressure from the splanchnic area. The splanchnic vessels dilate and fill with blood, a condition that is frequently found present in death from shock.

6. **Inversion of the uterus.** This also produces a sudden diminution of intra-abdominal pressure.

CHAPTER XIV

OBSTETRICAL OPERATIONS

DOUCHING

Indications. Douching has already been fully described on p. 89. The only things that need here be mentioned are the indications for vaginal douching during the conduction of labour.

Before the birth of the child. Vaginal douches.

1. If you have any reason to think the vagina is septic, e.g. a midwife of doubtful cleanliness has made a vaginal examination before your arrival.

2. If there is, or has been, a purulent vaginal discharge.

3. Before any obstetric operation.

In private practice, where we are sure of cleanliness, we sometimes put on forceps without a previous vaginal douche, provided the vagina is moist and the temperature not raised. The bed is often very big and the fluid may run on the floor and spoil the carpet. These are minor difficulties, and have no weight, where the advantage of douching is clear. But with a cleaned vulva, a clean patient, and sterile forceps, the advantage of douching the vagina is doubtful. After the birth of the child the liquor amnii will douche the vagina.

4. To relax a tight os and in primary uterine inertia.

After the delivery of the afterbirth. Intra-uterine douches are to be used.

1. When any intra-uterine operation has been performed.

2. To stop bleeding from the uterus.

VERSION

Version has been fully described on pp. 134–39.

INDUCTION OF PREMATURE LABOUR

Has been described on p. 270.

FORCEPS

We think inexperienced obstetricians attach too much importance to the method of applying forceps. The application is not really difficult. To know when to apply the forceps is most important. We think that when difficulty is met in applying, the propriety of the application is open to question.

The instrument. A forceps is an instrument consisting of two blades with handles, which lock together. The best form of lock is the English lock. Each blade has a pelvic and cephalic curve. The blades should not be too springy, too close or too far apart, when the forceps is locked. If too close they mark the foetus unnecessarily, if too far apart they slip. Our own forceps measures $\frac{5}{8}$ inches between the tips and $3\frac{1}{4}$ inches at the greatest width.

Choice of forceps. Practically any long forceps with axis traction can be used. We use Barnes' forceps with Neville's axis-tractor. It possesses the following advantages :—
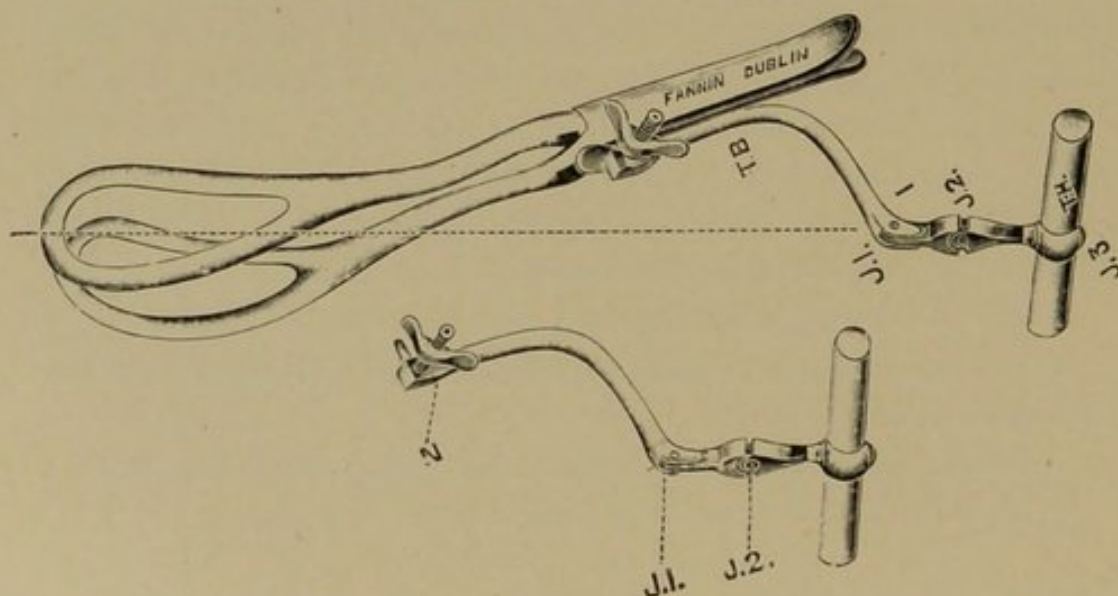
FIG. 134. Barnes' forceps with Neville's axis tractor. T.B., axis-tractor bar ; J. 1., joint 1 ; J. 2., joint 2 ; J. 3., joint 3 ; T.H., handle ; N, screw and pin for fixing axis-tractor to forceps.

1. It is applied as an ordinary long forceps and the axis-tractor is fitted outside the vulva after the blades have been locked. The complication caused by an axis-tractor, when the blades are being fitted, is avoided.

2. As the axis-tractor is outside the vulva, there are no grooved surfaces or locks, which are difficult to keep clean, within the vagina.

3. When the blades are in position and the axis-tractor fitted, the blades are kept in position. The hands are then freed, if necessary for giving more chloroform or other purpose, without fear of the blades falling out or shifting.

4. If attention is paid to the arrow mark on the instrument, one is always sure of pulling in the direction of the axis of the pelvis.

5. As regards its power, so great an authority on mechanics as the late Professor Fitzgerald of Trinity College said that from the mechanical point of view the Neville forceps is satisfactory, and from the point of view of practical experience we would urge that we have been frequently successful with this instrument when others have been unsuccessful.

Indications for forceps. Forceps are not so frequently indicated as was once considered. When indicated they are invaluable. When not indicated their use may be dangerous and add to the difficulties and dangers of the case.

Primary indications.

1. The os should be fully dilated, so that you cannot feel its rim with a finger in the vagina. If you feel the anterior lip and can push it up either partly or completely, but the rest of the os is drawn up above the largest diameter of the child's head, you can put on forceps.

2. The head should be fixed in the brim by its largest diameter. You can determine this by the fourth grip of abdominal palpation, by the absence of any overriding of the pubes by the child's head and by vaginal examination.

3. The bladder should be empty.

4. The membranes should be ruptured.

With these primary indications fulfilled, secondary indica-

tions for forceps are the signs, either maternal or foetal, which call for rapid delivery.

Secondary indications.

A. *Dangers on the part of the child.*

1. The foetal heart between the pains is counted below 120 or above 160. This suggests distress on the part of the child, more particularly if a slow foetal heart-beat is heard as a sequence to a rapid foetal heart-beat.

2. Meconium, unmixed with liquor amnii, is coming away and the head presenting. This suggests that the child's life was in danger at some time, but not necessarily at the time when the meconium is seen.

3. Tumultuous movements on the part of the foetus, noticed by the mother or doctor. These precede death of the foetus.

4. When there is a large caput succedaneum. This shows that the child's head is being subjected to great and prolonged pressure.

5. When the head is fixed and the cord prolapsed.

B. *Dangers on the part of the mother.*

1. Heart disease or lung disease, acute or chronic, call for as short a second stage as possible.

2. Typhoid or other severe fevers.

3. Acute chorea.

4. Atheroma of the blood vessels with or without paralysis.

5. Accidental or unavoidable haemorrhage.

6. Eclampsia.

7. Forceps, or some other mode of rapid delivery, is urgently called for, if there are any signs of threatened rupture of the uterus.

8. Prolonged labour affecting the mother, as shown by a rising temperature and pulse or a hot and dry vagina. A temporary rise of pulse without rise of temperature is often due to nervousness and is without significance.

Exhaustion due to want of sleep or the tardiness of primary uterine inertia are not indications for forceps. Secondary uterine inertia is never an indication for forceps, but an emphatic contra-indication. Nor is a slight degree of contracted pelvis, unless other signs arise. Nor want of proper

flexion of the head.   For example we recently had a primipara who delivered herself of a full-term child with brow presentation after a second stage of fifteen minutes.

9. If the second stage has lasted longer than two hours, with a first or second vertex presentation.

Position.   In private practice, when little or no help can be obtained, the left lateral position is the best position.   The patient's back is parallel to the head of the bed.   Her buttocks are well over the edge of the bed, her thighs and legs fully
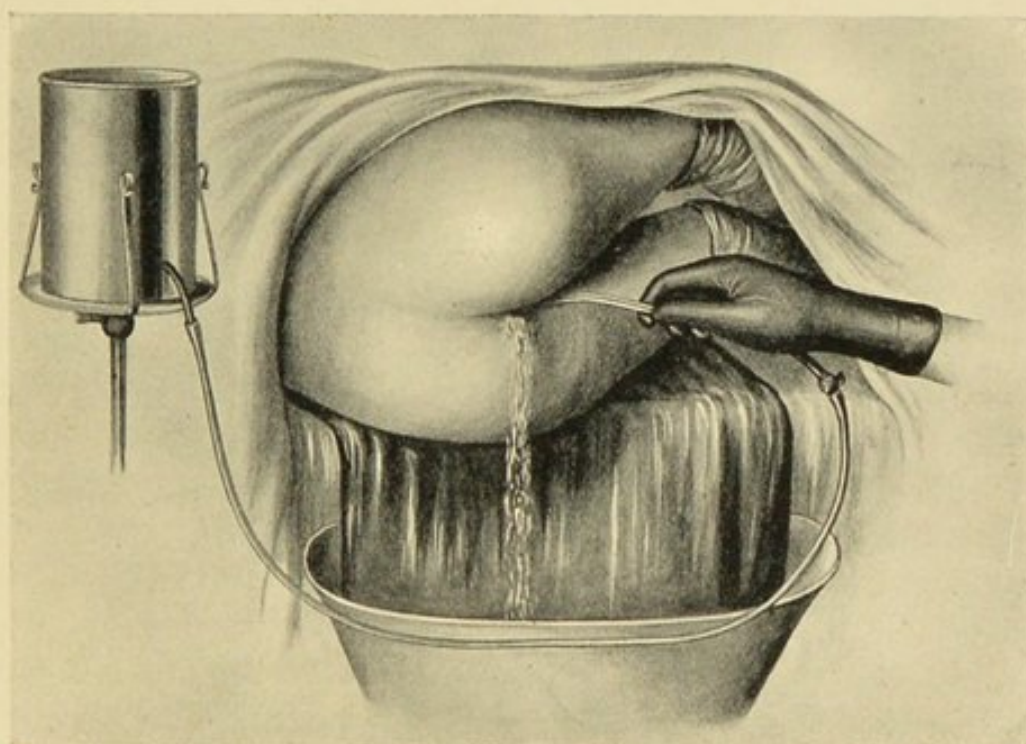
FIG. 135. Left lateral position of patient for forceps.   Also side position for a vaginal douche.   When douching, two fingers of the left hand should be in the vagina.

flexed to prevent her falling out of bed.   It is important to obtain this position exactly.   If the patient's back is not parallel with the head of the bed, you will find it awkward to put on forceps.   Place a chair opposite the patient's buttocks, for you will find it easier to put on forceps whilst sitting down and at the right level.   There is a mackintosh passing from under the patient and dipping into the bath; your batist apron also dips into the bath and covers your knees.   Your instruments, namely forceps, tongue forceps,

swabs of wool, catheter and vaginal nozzle, are in a basin of warm lysol to your left on a table. Your douche is on a chair or stool placed on the table. You also have a small porringer, in which is some soap with a little lysol to which is added boiling water.

The nurse sits on the bed at the patient's back.

The need of chloroform. Sometimes in private we are able to fit the forceps and keep them in position by the axistractor, take off our gloves, put them in biniodide, give the patient chloroform to full anaesthesia, cleanse our hands, put on the gloves again, and deliver the patient whilst she is coming round from the chloroform and the uterus is contracting.

We find in many cases, especially when the head is low down, that the fitting of forceps through the stretched vulva causes little or no pain.

In other cases we get the patient into position, give her chloroform to full anaesthesia, sterilize our hands, and apply the forceps. We deliver when she is lightly anaesthetized, directing the nurse, if need be, to drop a little chloroform on to the Skinner's mask, to keep her lightly under. The choice of these two methods depends on the ease with which we think forceps can be applied and the intelligence of the nurse. But as a general rule it will be found well to give an anaesthetic while applying the blades of the forceps.

Preliminaries to application. The external genitals are cleansed, the hands cleansed and rubber gloves put on, the bladder emptied, the vagina douched, and a final vaginal examination made to make sure that the membranes are ruptured, the os fully dilated or dilatable, and the head fixed by its largest diameter in the brim.

Application. First take the lower or left blade in your right hand. You can readily tell it from the upper blade by holding it with its concavity looking upwards. Its pelvic curve will then correspond to the curve of the patient's sacrum. You hold it, in fact, in the position which it will assume when you have fitted it to the child's head. The nurse now loops her hands round the patient's right thigh and raises it a little. You dip your left gloved hand into the weak lysol, which lubricates it, and pass your half hand into the vagina. Pass

your fingers up between the child's head and the hollow of the sacrum, where you will always find room. Pass the half hand as high as possible and make it lie, with the back of the hand and fingers along the curve of the sacrum and the concave palm looking forwards. The half-hand performs two functions, (1) it opens the parts like a posterior speculum and presses the perineum back, (2) it forms an intelligent posterior pelvic wall, aware of the progress and position of the blade and of any obstruction, such as a hand by the side
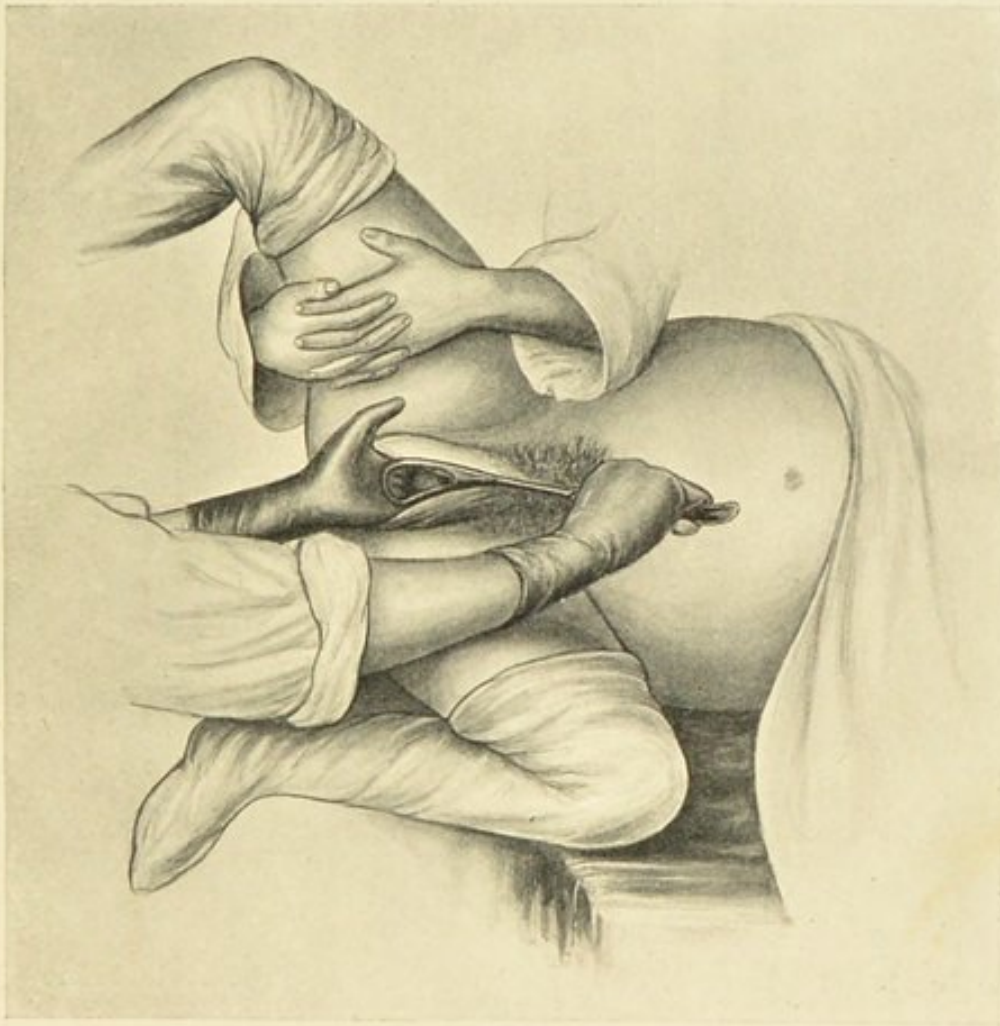
FIG. 136. Applying the lower blade of the forceps.

of the head or a projecting sacral promontory, to the progress of the blade.

Take the lower or left blade and direct the upper part of the blade into the palm of your hand in the vagina almost at right angles. To do this you have to hold the handle up between

the patient's thighs closely to the pubic bone. You direct
the blade, in fact, as if you wished to push it through your
hand in the vagina into the rectum. You then run the blade
up along your hand, keeping its upper end pressed into your
hand so as to prevent its striking on the foetal head. You
pass it as high as you can, burying it, so to speak, in the
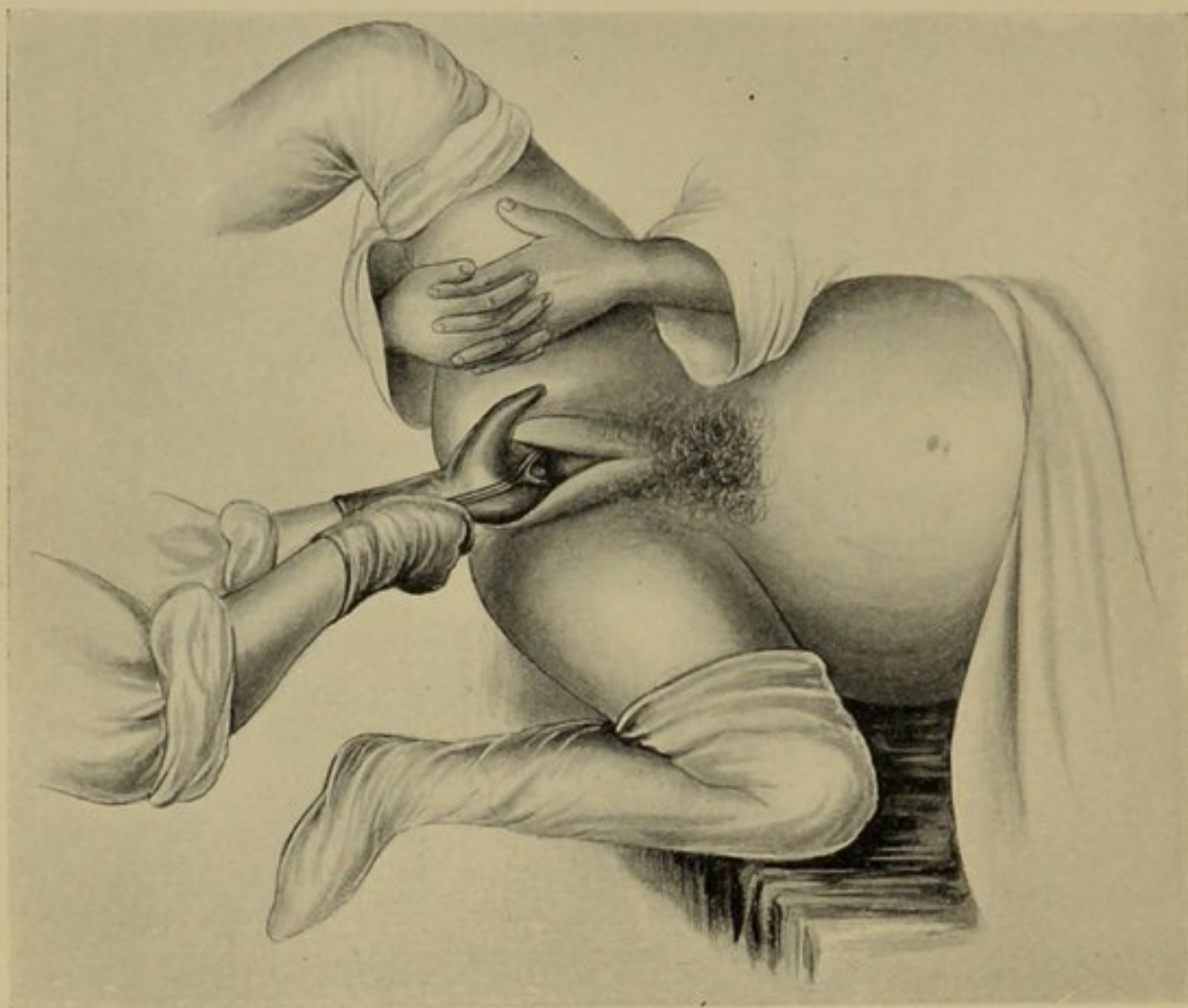
Fig. 137. The lower blade of the forceps, as a posterior blade, before
twisting.

vagina, with its cephalic curve in apposition to the palm
and fingers of your hand in the vagina, with the concavity
looking forwards.

Make no attempt to turn it into its lateral position, until
it has reached the highest point possible. If the head is high
up in the pelvic cavity, it will be necessary in the latter part

of the blade's ascent to press the handle well back against the perineum. This enables the blade to ride up along the sacrum until its upper part reaches a little above the sacral promontory. The blade is now sufficiently high. It lies all along the sacral curve, its upper part a little above the sacral promontory. It is, in fact, a posterior blade.

You now have to make it take a lateral pelvic position—to make it the lower blade, when the patient lies on the left side. To do this, simply twist the handle outside the vulva, so that the surface of the handle which looked forwards now looks upwards. The blade in the vagina follows this twist, and the concavity of its cephalic curve, which looked forwards, now looks upwards. This is its proper position, and we find that the twist nearly always brings it into position.

If it does not do so, the fingers in the vagina feel for and discover the reason why it does not. Common causes for this are that the blade is stopped from full ascent by a projecting sacral promontory, as in flattened pelvis, or is prevented from turning by catching in a fold of skin or overlapping suture. In the first case try and pass the blade higher. If you cannot do this and the forceps will not slip right up as a posterior blade, turn it and let it make the rest of the ascent as a lateral blade, which it will readily do. In the second case press the blade away from the head by raising the handle outside the vulva a little as you twist; or you can push and guide the blade round into position with your fingers in the vagina. In short, your hand in the vagina will tell you what is wrong and a little ingenuity will set matters right. When you have the lower blade in its right position, the handle is pressed well against the perineum. Keep it in this position by putting the shank under the ulnar edge of your vaginal hand and pressing on the shank. This enables an important rule to be followed, namely to push in the upper blade above and in front of the shank of the lower blade. If you get the upper blade behind and below the lower shank, hopeless confusion results. Do not remove your hand from the vagina. It keeps the lower blade in position, prevents its slipping about, and is just as useful for passing the upper blade as the lower.

Passing the upper blade. You pass the upper blade at first precisely as you passed the lower blade, that is to say you make it a posterior blade. When the upper part of the upper blade reaches a little above the sacrum, in other words when it is buried up to the handle in the vagina, with the handle pressed well back against your vaginal hand, change it to an upper blade by twisting its handle outside the vagina,
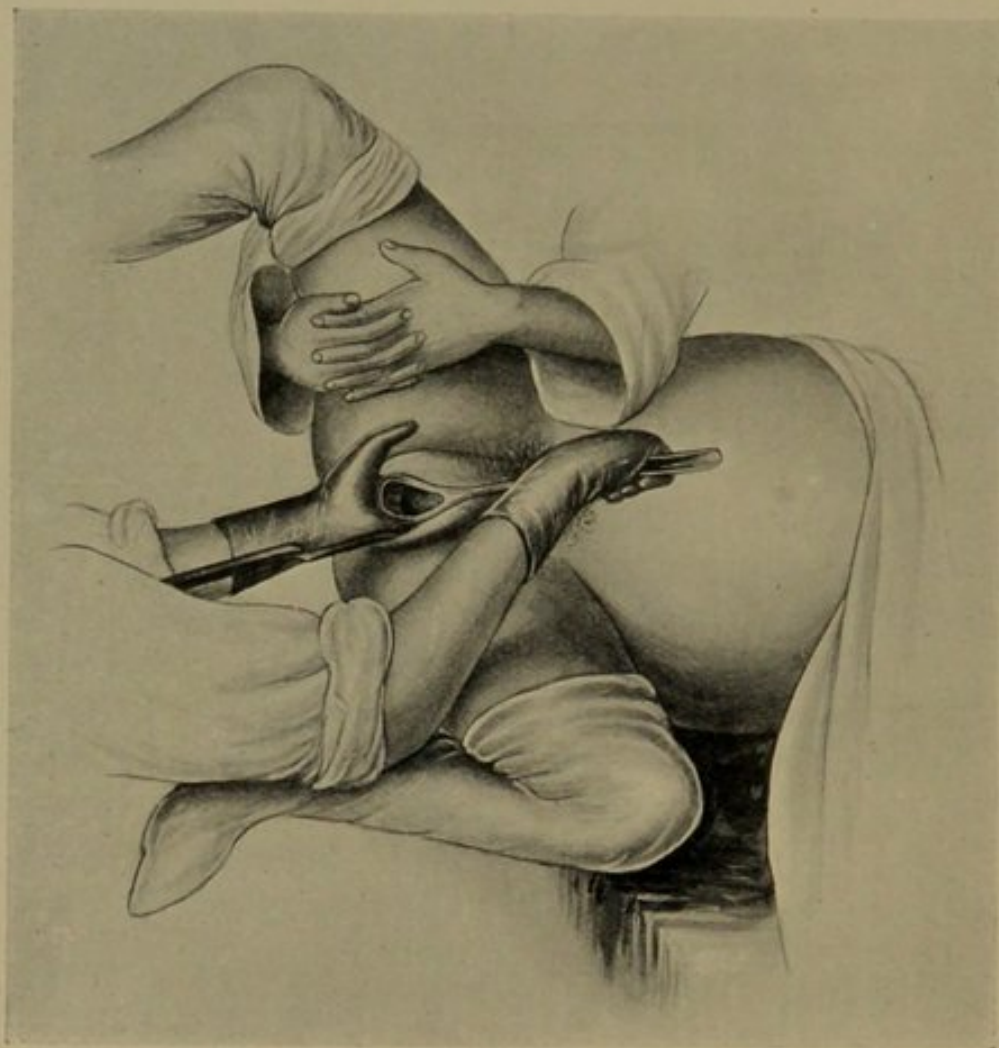
Fig. 138. Passing the upper blade of the forceps.

so that the surface which looked forwards now looks downwards. The blade in the vagina follows this movement, and the cephalic curve, which looked forwards, now looks downwards. If any difficulty arises in turning the blade, deal with it in precisely the same way as you did with the lower blade; only if you want to press the blade away from the foetal head, you must lower the handle a little, while twisting it.

Locking the forceps. The two blades are now lining the lateral pelvic walls with the foetal head between them. You have to lock the forceps. Hold the upper blade in position with your right hand. Withdraw your left hand from the vagina, keeping its ulnar edge deliberately pressed down on
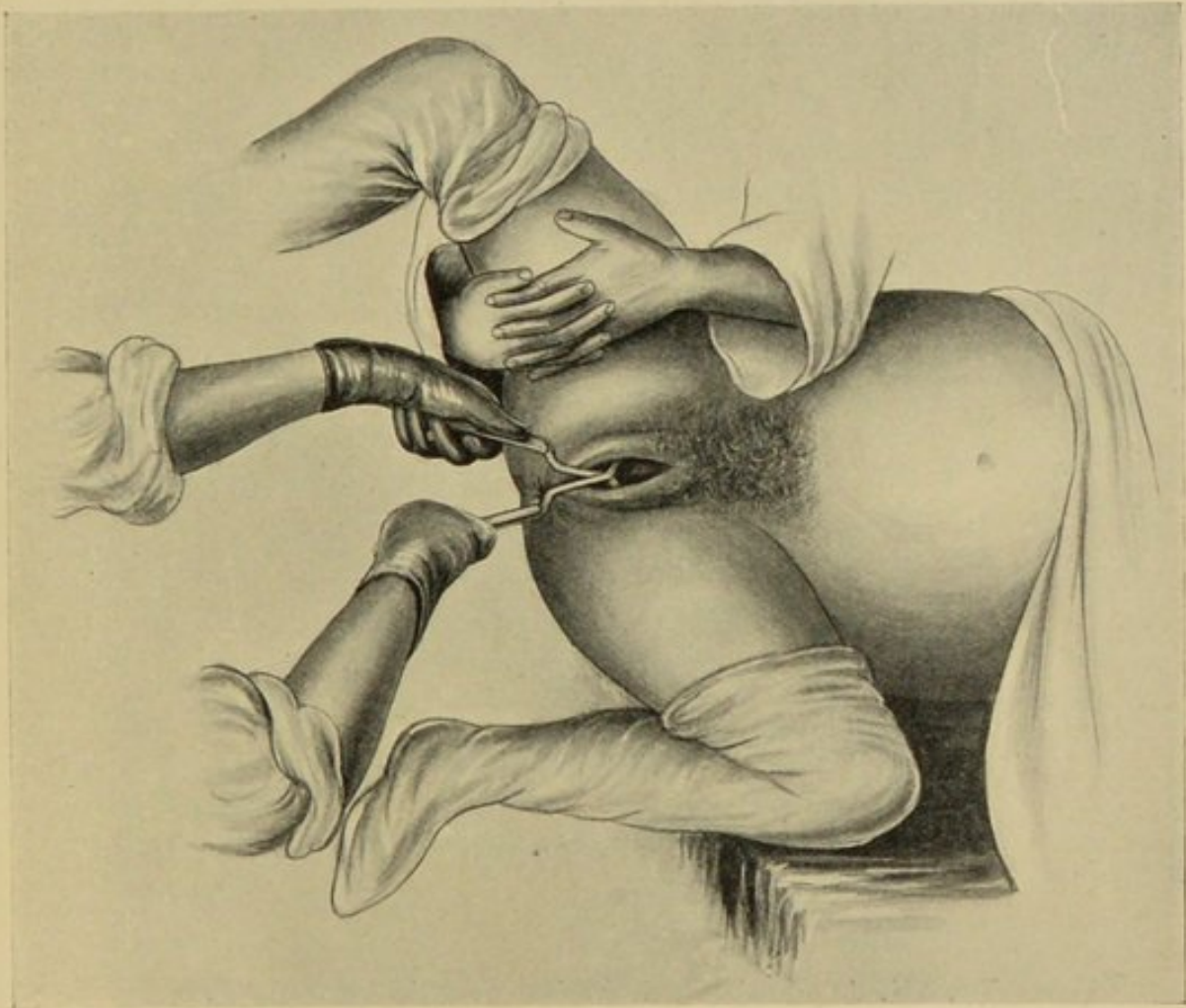
FIG. 139. Locking the forceps.

the shank of the left blade to prevent the left blade shifting from its position. Catch the handle of the left blade with the left hand, as soon as you have withdrawn it.

The English lock is locked in the following manner: The two flat surfaces of the handles of the forceps are facing each other. They have to be brought into apposition. Pass the handle of the upper blade down in front of, then underneath, and finally up behind the handle of the lower

x 2

blade. The method of locking is then obvious and should result.

If they do not lock, twist the handle of the blade that seems out of place, but do not use force. If this does not do pass the left hand again into the vagina and direct one or both blades into the lateral pelvic position. You need not withdraw the blades and reapply them unless you get confused. Now fit the Neville axis-tractor and the blades are held safely in position and cannot fall apart. The method of fitting the axis tractor is best learnt when the forceps are bought.

The question of fitting the forceps to the pelvic cavity or
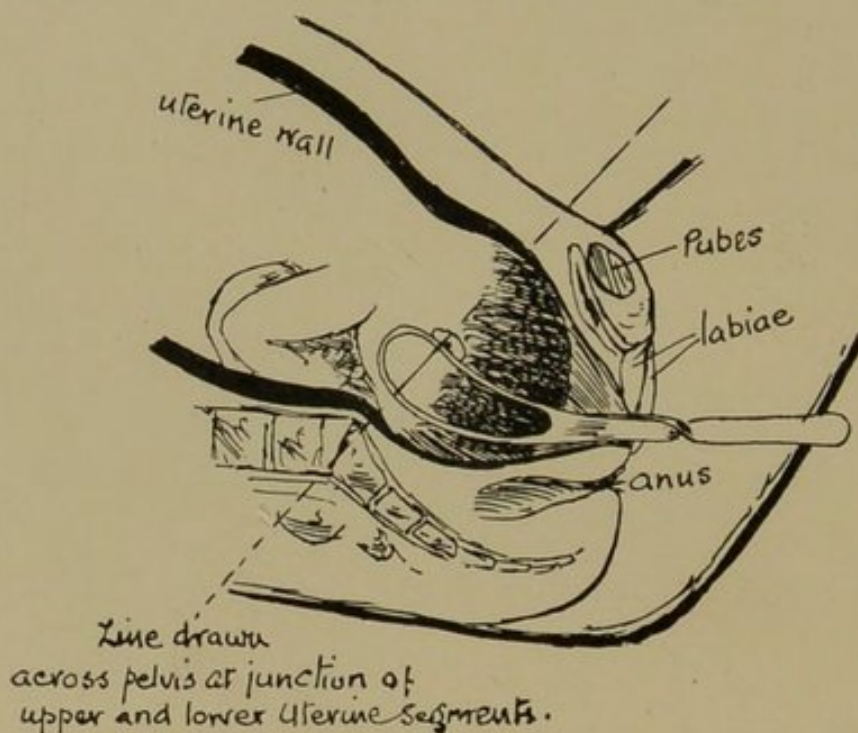
Fig. 140. Application of the blades to the side of the head.

to the foetal head. In this description of applying forceps, we have taken no notice of the position of the foetal head. The best position of the forceps on the foetal head is when the blades fit over either ear. Fortunately this is usually the case, for the occiput rotates to the front. If the head has not rotated properly the foetal face is turned to one lateral pelvic wall, the occiput to the other. The consequence is that by our method one blade fits over the child's face and the other over the child's occiput. Many obstetricians object to this, and in these cases make one blade anterior, the other posterior, so

that again each blade encloses an ear. This is a more difficult procedure, and we do not think it has any marked advantages to compensate for the increased difficulty.

Forceps with unrotated head. We fit the forceps as we have stated (p. 304) and pull. With descent of the head comes rotation, and the blades from being lateral blades become anterior and posterior blades. These positions of the blades are unfavourable for delivery, as they stretch and tend to rupture the vulval orifice. You have to reapply. First get the nurse to press from the abdomen down into the pelvis on the head and maintain this pressure, whilst you reapply the forceps. Unless she does this, the head slips back again to its unrotated position. Take the blades off and reapply as lateral blades, enclosing either ear.

How to pull. The patient must not be deeply under the anaesthetic when you pull. The paralysed uterus will fail to contract and retract after delivery and there will be serious post-partum haemorrhage. When the degree of anaesthesia is quite light, the contractions of the uterus help delivery and prevent subsequent post-partum haemorrhage.

The nurse sits between the back of the patient and the head of the bed. She loops the right thigh with her hands in a firm grasp, and whilst you pull she forms a counter-resistance.

Hold the handle of the axis-tractor with both hands and carefully watch the arrow and indicator to see that you are pulling in the right direction. If you think the forceps is slipping you can easily find out. Put two fingers of one hand on the head and pull the axis-tractor handle with the other hand. If the blades are slipping, you will feel no advance of the head. If they are slipping the grip of the head is not high enough. Unlock the forceps and push the blades up higher, or reapply.

In pulling, use sufficient force to gradually bring the child down. Sometimes to effect this you have to pull as hard as you are able. At times, with your unconscious patient in the left lateral position, and in spite of the efforts of the nurse, you find that you keep pulling the buttocks of the patient round towards yourself and you cannot pull longer without climb-

ing on to the bed. If, therefore, the pull begins to prove hard, get the patient on to her back. The nurse goes to the other side of the bed and holds the patient firmly under the arm-pits to prevent her being pulled out of bed. This may seem an extreme exhibition of force, but all obstetricians have met, and will still meet, with cases in which they have to fix their feet against the bed and pull with all their force to effect delivery with forceps. Moreover, they find they deliver a living child, and neither mother nor child suffer in the great majority of cases. Sometimes when the head advances badly, you can make it progress better by rocking the forceps a little from side to side or up and down as you pull. A similar action is used in getting a tight cork out of a bottle.

When the head is on the perineum. Some authorities advise that the blades should be removed and the head delivered by natural pains. The blades add little or nothing to the bulk of the head. We, therefore, do not take off the forceps. It is convenient, however, to change one's position, if the woman is in the left lateral position. Stand up and pass your left hand from the abdomen between the patient's thighs and catch the forceps with this hand. Remove the axis-tractor. You can now direct the progress of the head. If it advances too quickly you can press the forceps back, if too slowly you can pull gently, directing the handles up towards the woman's abdomen. When the head is actually stretching the vulva the mother sometimes 'breathes it out', the head advanc-ing with each inspiration. Nothing could be better than this, for the more deliberately and gradually the head advances, the more perfectly does the perineum roll back over the head, and rupture is mitigated or avoided.

When the head is born. Remove the forceps and conduct the rest of delivery as in normal labour. Sometimes the child's face is white, the pallor of white asphyxia. When this is the case deliver at once. After delivery of the child, provided the child is all right, hold open the perineum, and, if it is torn, stitch it before the patient comes round from the chloroform.

As in all cases in which chloroform has been given for some time, the third stage is likely to be prolonged. Provided the

woman does not bleed and has no shock, there is no harm in allowing the uterus two hours to push the placenta into the vagina.

Dangers to the child. Over and above the occurrence of asphyxia neonatorum, a difficult forceps delivery is not without danger to the child. Meningeal haemorrhage may occur and lead to convulsions and death. Idiocy and some form of birth palsy may follow. Deformities or indentations of the skull as a rule pass away in a few days.

Depressed fractures are more serious. Dr. Munro Kerr has practised with success a simple method of restoring a depressed fracture. He places the child's head between his knees and compresses it in a direction opposite to that in which the long axis of the fracture lies. In this way the fracture is forced out. We have succeded in doing this on artificially produced depressed fractures in dead children, but not in a live child, probably because we have not used enough force.

On the other hand success has uniformly attended the following safe and simple method. The sharp point of one blade of a bullet forceps is bored through the bone at the centre of the fracture. The point must be sharp, else the depression is increased. The shank is then turned at right angles to the bone, and the depressed fracture pulled with a jerk into position.

Facial paralysis may result. It recovers commonly in a day or two. If it persists, it must be treated by electricity.

CAESARIAN SECTION

When Caesarian section is done under favourable circumstances, it is amongst the easiest and safest of abdominal sections. When performed after a woman has exhausted herself with efforts to bring about an impossible delivery, or many attempts have been made to deliver per vaginam, it becomes a very dangerous operation. It is important, therefore, to be able to recognize the indications for Caesarian section—and fortunately this is easy to do—as early as possible, and to decide finally on its advisability.

Indications. The indications have already been discussed under Contracted Pelvis, Pregnancy with tumours, and cancer. The only other indication is death of the mother, when immediate operation is done to save the life of the child. Within twenty minutes of the death of the mother is usually given as the time limit.

Time of election. The best time to perform Caesarian section is in the early stage of labour, and certainly before the rupture of the membranes. The patient is not fatigued by the pains of labour; contraction and retraction of the uterus, which prevent post-partum haemorrhage, are assured, and the os is sufficiently open for free drainage. Therefore immediately the patient falls into labour make preparations for the operation. In fact, decisions as to the general arrangements, the room, the table, the nurse, the assistants, must all be made in the last months of pregnancy.

In general practice it may not be possible to be ready quickly. Kelly has practised the operation towards the estimated end of pregnancy without waiting for the onset of labour, to avoid having to undertake the operation at night. His results go to show that Caesarian section can be undertaken safely before labour has set in. Contraction and retraction of the uterus are efficient, and drainage can be ensured by pushing the finger from the uterus through the cervix during the operation.

Preparation of the patient. Give the patient a warm bath, if there is time. Give a rectal enema to empty the bowel. If possible the patient should not have had any solid food for six hours, but this is not always possible. The danger from the patient being sick during the operation is not so great as that from deferring the operation. Empty the bladder by a catheter before cleansing the vagina, and just before the operation.

Preparation of the skin and vagina. The pubes is shaved. Then scrub the vagina with soap and water, and douche it out with salt and water or creolin solution. Scrub the abdominal skin lightly with soap and water and a nail brush, to wash off the superficial epithelium. Pay special attention to the umbilicus and pubic region. Wash off the soap with

plenty of water. Rub the skin over with ether to get rid of fat, and put on a lint compress of biniodide of mercury (1–2000) dissolved in methylated spirit 70 per cent. and water 30 per cent. This is intended to disinfect the skin. At the same time the alcohol hardens the epithelium and prevents macerated epithelium being rubbed off during the operation.

The room. Failing a properly equipped surgical theatre, any clearly and well lighted room will do. Should the operation have to be undertaken at night, good artificial light is essential, for nothing is more likely to lead to disaster than poor light. Two lamps and plenty of candles will suffice, but it is well not to be sparing in the number of candles. Unless the artificial light is electric or incandescent, avoid ether, for the vapour catches fire with extraordinary readiness. Even if the anaesthetist uses chloroform, the anaesthetic of choice, the room must be well ventilated, for an artificial light near chloroform forms carbonyl chloride which will choke all concerned. A deal kitchen table covered with two or three blankets, a mackintosh, and a sheet from below up, forms the operating-table.

Instruments. The minimum of instruments needed is—

1 sharp scalpel.

12 artery catch forceps, either Spencer-Wells or Kocher's.

1 pair of straight scissors with rounded ends.

1 or 2 bullet forceps.

Curved needles from medium sizes to large in gradation.

1 straight skin needle. (An ordinary glover's needle is sharper than a surgical needle.)

1 needle-holder.

Japanese silk thread for sutures, No. 2 and No. 4 size, disinfected by boiling for ten minutes in 1–1000 corrosive sublimate solution, and kept in this solution.

A few pieces of silkworm gut sterilized by boiling for suturing the skin.

Gauze sponges or wipes in bundles of ten, so that they may easily be counted, and a long roll of plain gauze; these may be brought ready sterilized.

Sterilization of instruments, &c., at the house. The basins,

in which the instruments and wipes are placed, are too large to be boiled. We wash our hands and scrub the basins inside and out with Monkey brand soap, or with ordinary soap and a boiled nail brush. Flush this soap away by holding the basin under the tap. Finally, fill the basin with corrosive sublimate (1–1000). We look upon this cleansing of basins before obstetric operations as an essential precaution.

The instruments are boiled in weak lysol (or soda solution to prevent rusting) in a fish-kettle. They can well be kept in the fish-kettle, which forms a sterile dish for them. They are boiled for twenty minutes. The knife is blunted by prolonged boiling. Wrap it in wadding and boil for three minutes. We use rubber gloves, boiling them in water and then soaking them in a basin of methylated spirit.

During the operation, have the instruments in basins in plain boiled water.

Assistants. Three assistants at least are necessary. One gives chloroform, a second assists during the operation, and a third attends to the instruments and takes the baby, when the cord is tied and severed. A fourth assistant is useful, for he can take the baby and leave the third to help throughout the operation.

Cleansing of the hands and forearms of the operator and two assistants. We use rubber gloves, and for fear that they may be torn or punctured during the operation, we adopt a slightly different method of sterilizing our hands from that employed in ordinary obstetrics. Pare the nails, wash the hands and forearms with soap, water, and boiled nail brush, each man having separate basins, soap, and brushes. Wash off the soap and immerse and splash the hands and arms in biniodide of mercury (1–1000) solution in 70 per cent. spirit and 30 per cent. water. Experience has shown this spirit solution of biniodide of mercury to be a very efficient, if not the most efficient, solution for disinfecting and hardening the skin. If gloves are now put on the biniodide solution is locked up and corrodes the hands. If the disinfectant is washed off with water and the gloves put on, the epithelium macerates with the warmth, and a septic perspiration collects in the gloves, which is

dangerous, if it escapes from a puncture of the glove during the operation. We, therefore, wash off the antiseptic by rinsing in a basin of methylated spirit. The gloves are in a basin of methylated spirit. They slip on easily. The spirit prevents sweating and maceration of the epithelium, and we have found the glove contents to be sterile after operations of two hours' duration.

Wear clean aprons or overalls. Your clean batist apron will do, for if boiled and dried folded, the folded-in surface is sterile. In hospital we wear dry sterilized overalls with long sleeves, over the cuffs of which we turn the gloves. We also wear sterile caps and mouth bags.

Position of the patient, surgeon, and assistants. In the absence of an operating table which permits of the ordinary gynaecological position, pull the patient, when under chloroform, to the end of the table, so that her legs hang over the edge of the table. Tie them loosely to the legs of the table. Stand between the legs of the patient, for this is a convenient position at first, but many prefer to stand on the left side of the patient. If you stand between the legs of the patient, an assistant stands on either side.

Preparation of the area of operation. Remove the compress and wipe the abdominal skin with a sterile sponge soaked in ether and held by forceps, so that you do not touch the skin. Follow this with biniodide of mercury in spirit, and finally paint the whole surface of the abdominal skin with a saturated solution of picric acid in methylated spirit.

The work of Sabouraud seems to us to confirm this method. He found the soft and carefully washed skin forms a bed in which microbes live and multiply, whereas the dirt-hardened skin of the labourer is comparatively sterile. We avoid injuring the epithelium by hard scrubbing, and endeavour to harden it by spirit and picric acid. Spread a wet sheet of boiled batist, with an oval hole or slit cut in it, over the abdomen. Secure the bottom of this opening to the skin just above the pubis either by a salmon gut suture or by catch forceps. Similarly secure the upper end to the skin about four inches above the umbilicus. Over

this place a sterilized sheet, boiled, and then dried in the oven, with a slightly larger central opening, and let this sheet overhang the edge of the table on either side. This sheet is useful for instruments, sponges can be temporarily laid upon it, and if you touch it your hands are not contaminated.

The operation

Opening the peritoneal cavity. Begin the incision in the middle line some 3 to $3\frac{1}{2}$ inches above the navel. Cut down the middle, curve round the navel, and continue the cut for four more inches in the middle line. Sever the skin and fat with this cut. You expose the glistening muscular aponeurosis of the recti in the whole extent of the wound. Cut through the linea alba between the recti muscles or separate the muscles with a blunt instrument. Then catch up the fascia below the muscular layer in two places half an inch apart with catch forceps. Pinch this piece of uplifted fascia to make sure that no intestine has been seized. Cut between the forceps cautiously with the knife. Pull up the next layer and treat it similarly, until the peritoneum is caught up and the cavity opened. Open the peritoneum near the umbilicus. You will thus avoid all risk of injuring the bladder.

When you have opened the peritoneal cavity, you see the large pregnant uterus. Insert a finger into the peritoneal cavity, and using it as an intelligent guide open the cavity for the whole extent of the wound with the scissors. Be cautious as you approach the bladder, which you can feel and see. If the intestines fall over the uterus push them up towards the diaphragm and keep them back by a long roll of plain sterile gauze wrung out in sterile salt solution.

Cutting into the uterus. Examine the uterus to see that it is lying straight as regards the skin incision. If it is not, make it do so, and get one assistant to press back the skin wound and so squeeze the uterus up out of the wound. If the uterus is not straight, the slanting cut exposes a larger bleeding surface. There is no need to pack round the uterus with gauze, to shut off the liquor amnii from the peritoneal cavity, unless you have any reason to think the uterus may be septic. The patient must now be only lightly

anaesthetized. Make a cut rapidly from above downwards into the uterus beginning at the fundal extremity and extending downwards for five inches. Speed is essential to this part of the operation, speed and a cool head. Blood flows freely. If the placenta is not lying in front, you reach the membranes without the occurrence of unnerving haemorrhage. On the other hand, if you have to cut through the placenta, you may have great haemorrhage. Cut deliberately. If you slash the uterus open, you may cut the child, although the child has rarely been seriously injured in this way. To avoid unnecessary haemorrhage or the occurrence of the above accident, it is well to begin our incision above and to make it no longer than an inch in length, until the cavity of the uterus is entered. Thus with a forefinger plunged into this hole, the uterus can be rapidly incised to the full length desired.

Extraction of the child, placenta, and membranes. Whilst the liquor amnii is escaping, plunge your hand into the uterine cavity, catch the child's leg and extract the child. Sometimes, if your incision is too small, the rapidly contracting edges of the wound catch round the child's neck. If you cannot pull the child through, extend the wound with the knife. Hold the child up by the legs, nip the cord with catch forceps, sever the cord below the forceps, and hand the child to the assistant or the nurse, but avoid touching them. Remove the placenta manually. If the membranes do not follow, wipe them out with a swab of gauze.

Special duties of the assistants. The two assistants have important parts to perform at this stage. Whilst the child is being extracted, one assistant keeps the fundus back in the abdomen. As soon as the child is extracted, he presses the uterus up out of the wound with a hand on either side and clips the skin wound together, with forceps underneath the protruded uterus to prevent it falling back. He then puts a boiled towel wrung out in hot water round and under the uterus to form a warm bed for it and to make it contract. The other assistant passes his hands through the abdominal wound down into the pelvis on either side of the uterus, catches both broad ligaments and cervix and bunches them

up. He in fact grips the lower part of the uterus in a tight grip, and so controls haemorrhage.

Sewing up the uterus. Before sewing up the uterus, if you are operating before labour has begun, push your finger through the cervix to allow of vaginal drainage.

As long as the assistant keeps a tight grip of the broad ligaments and cervix, there will be no haemorrhage. You can sew up deliberately. Use a curved needle with No. 2 Japanese silk, and sew up with interrupted sutures about half an inch apart. Do not tie them until all are in position. They should pass through the uterine wall deeply, but not through the decidual membrane. In tying, bring the edges into firm apposition, but do not pucker the tissues for fear of strangulation. Cut them short, and, if any gap is left, insert others. Some advise that these sutures should be buried by sewing peritoneum over them, but we do not think this necessary.

Fine silk is absorbed, for having had occasion to perform Caesarian section a second time within twelve months on the same patient, we could find no sign of sutures, scar, or adhesions of the uterus to the abdominal wall, showing both that silk absorbs, and that severed muscle may unite admirably.

The question of sterilization. The question of sterilization will have been considered before the operation was undertaken. To sterilize the patient pass two ligatures of No. 2 silk round each tube about an inch apart and cut away the tube between these ligatures.

There is no need to sterilize the patient for fear that a further pregnancy may cause rupture of the uterus, for there is practically no fear of it doing so.

Closing the peritoneum and wound. The first assistant unclips the skin under the uterus and lets the uterus fall back into the abdomen. The second assistant removes his hands from the abdominal cavity. Count the sponges to see that none are missing. We fill the peritoneal cavity with saline solution before sewing up, with the idea of preventing adhesions and giving the patient fluid.

Sew up the peritoneum in three layers, the peritoneum and aponeurosis with continuous close silk suturing. These sutures remain buried. Bring the skin together by any ordinary

means. We choose the subcuticular method. Pass a long piece of silkworm gut on a straight needle in a zigzag manner first into the skin on one side and then on the other, beneath and not including the surface epithelium. Pass each free end at either end of the incisions through a hole in a long leaden plate and tie them together over the leaden plate. If the ends will not reach, tie another piece of gut to one of them and then tie. Lay a few aseptic pads over the plate and keep all on with a firm binder. Put the patient back to bed.

After-treatment. For the first forty-eight hours the patient lies on her back. A catheter is passed every six hours. At the end of twenty-four hours we give calomel gr. j every hour up to gr. vj. Then we give a saline purge, usually one or two tablespoonfuls of effervescing magnesia. If the bowels are not opened within thirty-six hours a soap and water enema is given. The patient has water to drink, one ounce at a time, if not sick. When the bowels have opened, food is given and the baby is put to the breast.

The dressings are not touched until the eighth day. The silkworm suture is then cut and pulled through, a procedure which causes little or no pain. Another sterile pad is put on the wound and remains there until the necessity for it ceases to exist.

The patient is kept in bed for four weeks.

SYMPHYSIOTOMY

Indications. The indications have already been discussed under Contracted Pelvis. The operation adds about half an inch to the conjugate diameter of the brim. The transverse diameter is also widened. Walcher's position, when the head is passing the brim, adds another half inch to the conjugate.

Preparation. Preparations are much the same as for Caesarian section, if there is time. If the operation has to be done hurriedly, the pubis is shaved, washed with soap and water, ether and biniodide of mercury. The vulva, vagina, and hands are cleansed as for any obstetric operation.

Instruments. The minimum needed will be—

1. A scalpel.
2. Six Kocher's or Spencer-Wells forceps.

3. Gauze wipes.

4. Needle-holder, curved needles, and sutures of silk-worm gut.

5. Scissors.

6. Director.

7. No. 2 Japanese silk.
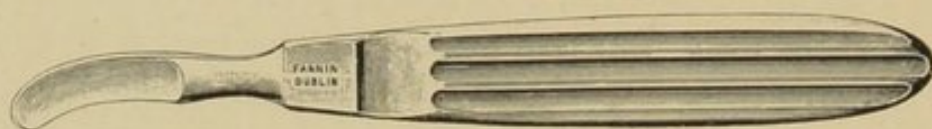
Fig. 141. Pinard's symphysiotomy knife.

Time of election. The best time is to do it when the os is sufficiently dilated or dilatable to permit of rapid delivery. It may, however, be undertaken at any time during the second stage. You must be sure the child is alive.

Assistants. One assistant to give the anaesthetic and one or a nurse to help are needed.

Position of the patient, operator, and assistant. The patient is put in the cross-bed position, but you must make the bed firm and prevent it sagging in the middle. You sit between the patient's legs and the assistant on the bed either to the right or left of the patient.

The operation. Make an incision through the central skin of about two inches, starting half an inch above the symphysis, continue it over the symphysis down towards, but to one side of, the clitoris. If you go too close to the clitoris, you will get severe haemorrhage. Deepen the incision over the pubis until the knife grates on the bone. Insert a finger into the wound and pass it over and down behind the pubis. Separate the bladder well by sweeping the finger from side to side between the bladder and the pubis. Pass the finger further down, hook it under the pubic arch and free the front of the bone. You have now cleared the bone.

Pass a catheter into the bladder and make the assistant hold the urethra to one side with it. Get the anaesthetist to come round and sit on the other side of the patient. Your two helpers keep the hips pressed together, for when you cut through the symphysis the bones may gape suddenly from

the descent of the head, resulting in injury to the bladder and severe haemorrhage from torn soft parts.

Put one finger of the left hand again into the wound and

AB shows line of cut in Symphysiotomy
CD   do   Pubiotomy
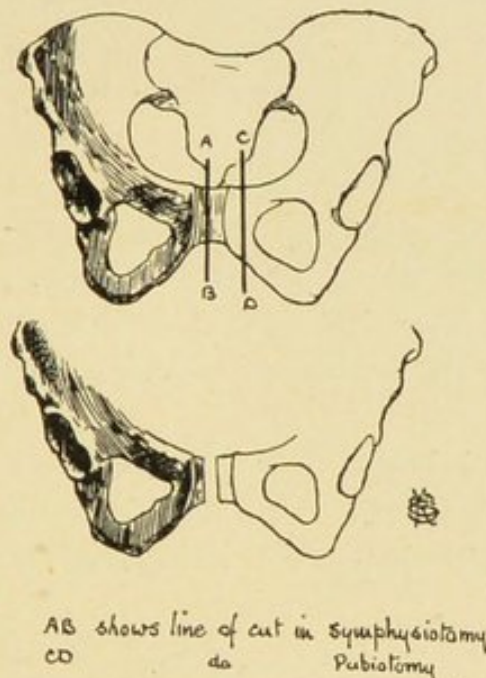
FIG. 142. Diagrams of the lines of separation of the bones in symphysiotomy and pubiotomy.

keep back the bladder. Cut through the cartilage of the joint with the knife slowly from above downwards, without severing the stout subpubic ligament. If preserved, this ligament, though stretched, forms a natural splint and facilitates a successful recovery. The knife readily passes through the cartilage. Sometimes you have to cut the subpubic ligament to allow for sufficient room for the head to pass. Stop any haemorrhage by tying the bleeding vessel with silk or by the pressure of iodoform gauze.

The child is either delivered by the natural pains, or you can use forceps or version. Remember Walcher's position, and do not deliver the child when the patient is deeply anaesthetized.

Push a strip of gauze from above downwards between the bladder and the bone to prevent the former getting nipped. See, too, that the gauze does not get between the bones. Leave the end of the gauze protruding out of the wound above. Close the rest of the wound from above down with interrupted silkworm gut sutures. Dress the wound with aseptic pads or

gauze and wool and keep on the dressing by a T bandage. Pull the separated bones together by a stout canvas belt with straps and buckles. An ordinary navvy's belt from a harness maker does very well. A binder is not strong enough for this purpose, but will do until you get the belt.

After-treatment. The patient lies on her back for twelve days.

Pass a catheter every six hours. Open the bowels, and give water and food and put the baby to the breast as after Caesarian section. Remove the gauze plug at the end of the third day. Other dressings and stitches are left until the tenth day, provided the wound is clean. Watch carefully for cystitis; this is a possible sequel if the bladder has been injured.

Convalescence is bound to be more tedious and difficult than after Caesarian section. Six weeks in bed is usually assigned. In most cases union is perfect, but sometimes a limp results.

PUBIOTOMY

Comparison of pubiotomy and symphysiotomy. The indications for these two operations are the same, the added half inch that they give to the conjugate of the brim is the same, and therefore it becomes essential to decide which of the two is the better operation. At present no one has really had enough experience to do so. Symphysiotomy is the older operation, but for all that we think pubiotomy will be the operation of choice for the following reasons :—

1. It is easier to perform.
2. The bladder and urethra are less likely to be injured.
3. Severed bones unite better than cartilage.
4. Convalescence is very easy; there is no need for the binder to be very tight, and, except for a simple dressing over the stitched wound, it hardly differs from the normal puerperium.
5. There is sometimes a lasting increase in the size of the pelvic brim.

Disadvantage of pubiotomy. You may not have the special instruments required with you. Those for symphysiotomy you always have.

Preparations, assistants and instruments. Although in the main these are similar to those before symphysiotomy, yet there are some special points.

A Gigli's wire saw and a Döderlein's needle will be wanted.
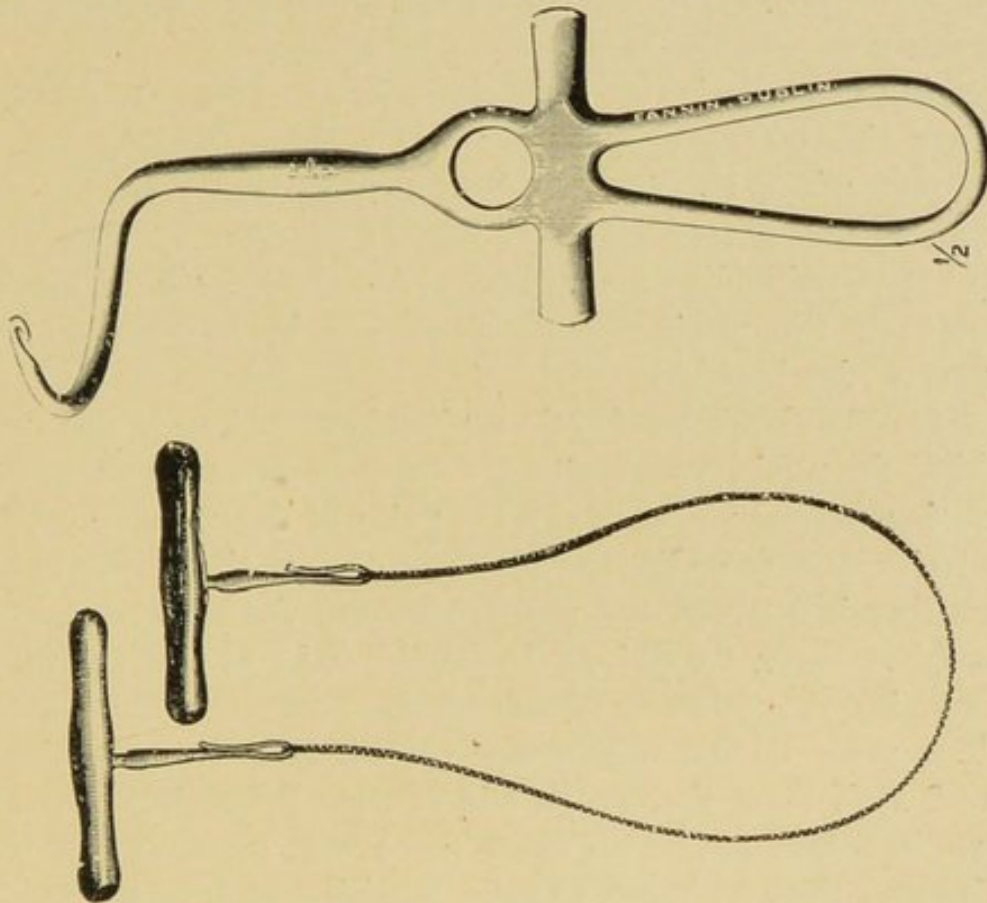
FIG. 143. Döderlein's pubiotomy needle. Gigli's saw.

It is as well to use a new Gigli's saw, for an old one may break.

Time of election. The best time is when the os is nearly fully dilated. If the membranes have ruptured, it is a pity but not a contra-indication. The child must be alive.

Plugging the vagina. First plug the vagina in the manner described on pp. 125–126. This plug will promote labour pains, dilate the os, and, by stretching the vagina, allow of rapid delivery. Whilst the plug is in the vagina, make preparations for the operation. The patient can be kept just unconscious with chloroform, if it had to be given for the plugging.

Operation. The positions of the operator and patient and the duties of the assistants are precisely similar to those

described on symphysiotomy. The patient is in the cross-bed position, the operator sits between her legs and an assistant on either side, one of whom has washed hands to help; the other gives chloroform, and, at the time of the severance of the bones, presses against one thigh. Remove the plug and carefully douche the vagina and pass a catheter.

Make a vertical cut half an inch or a finger's breadth to one side of the symphysis pubis, sufficiently long to get one finger into the wound. The saw is not passed too far out. It severs the ligaments that pass from Poupart's to the supra-pubic ligament. Deepen the cut until the knife grates on the pubic bone. Then put in one finger and separate the bladder.

Pass Döderlein's needle through this wound, over and then behind the pubic bone, and down towards the same side of the anterior vaginal wall. Make the point of the needle hug the posterior surface of the pubis closely, even to the extent of insinuating it between the periosteum and the bone, were this possible. Put a finger into the vagina and feel that the point is hugging the posterior surface of the bone.

The point of the needle emerges beneath the arch about $\frac{1}{2}$ to $\frac{3}{4}$ inch from the centre, and you see it bulging the soft parts in front of it. Pull these parts well inwards over the point and your assistant exposes it with a nick of the knife. The object of pulling the parts inwards is to ensure that the point of the needle emerges through the skin outside the labium, and that the whole operation is extra-vaginal.

Attach the Gigli's wire saw to the special hook on the end of Döderlein's needle. Then withdraw the needle, which pulls one end of the saw out of the upper wound.

You now have the saw in place passing behind the pubic bone. Get your assistants to press the thighs together, and get one to press a clean finger on the anterior surface of the pubic bone at the spot where it is to be severed, so that you may know when you have severed the bone. Attach the two handles to the ends of the saw and saw up and down, keeping the saw as straight as possible, for there is then less laceration of soft parts. Go cautiously when you think you have nearly severed the bone, and be ready yourself to detect

FIG. 144. Chart of a case of delivery by pubiotomy.

complete severance by the change of sensation, should your assistant fail to detect it at once. You can tell before the saw is withdrawn by pressing the skin between the separated bones with the top of your finger. The bones, apparently, do not spring apart, unless the head is being forced down by the contracting uterus. If there is haemorrhage stop it by plugging with iodoform gauze.

When you have severed the bones, let the woman deliver herself, getting her, while still unconscious with chloroform, into Walcher's position, whilst the head passes the brim. If she fails to deliver herself in an hour, or if she is at all collapsed, deliver her artificially, unless there is complete uterine inertia. With artificial delivery you may get bad tears which bleed. Plug them with gauze. Sew up the wounds with salmon gut and dress them with iodoform gauze wool and keep it on by strips of plaster.

After-treatment. The bladder, bowel, food, drink, and baby, are all cared for as after Caesarian section. Put on a firm binder or strips of plaster round the pelvis. Keep the patient on her back for twelve days. Remove dressings and stitches on the eighth day and let her get up on the fourteenth day. Our patients have had no difficulty in walking after getting up.

If, when the catheter is passed, blood comes with the urine, the bladder has been injured. Tie in a catheter for four days, by which time the wound will have healed.

Prognosis. Gigli has collected 300 cases with a mortality of three per cent. The deaths occurred in cases that were septic before the operation.

PERFORATION

Reason of its past frequency. Perforation is an operation that is far less frequently performed nowadays than in the past. In the past the perforator was used too much, the reason being that in private practice the pelvis was not measured and the abdomen was not palpated. Forceps were often applied before the indications for them were fulfilled, that is, the fixing of the head by its largest diameter in the brim and the

full dilatation of the os. This application of forceps to the head above the brim was known as the operation of high forceps. A doctor watched his patient in labour for some twenty-four hours and then decided to deliver her, although none of the indications for forceps was present. The temperature and pulse of the mother were not noted at all. He then put on the 'high' forceps, and sometimes succeeded in delivering the child. When there was some degree of contracted pelvis as often as not he failed, and he then proceeded to perforation. Had he waited until the head moulded, this disastrous finale would seldom have occurred. We know, for example, of a doctor who, having tried to pull a child through with high forceps, rode twenty miles to fetch his perforator. On his return he found the child born by the natural efforts of the mother.

We never recommend 'high forceps'. As a matter of fact, we have occasionally put forceps through an os that was quite or nearly open, with membranes ruptured, &c., on to a head that was not properly fixed in the brim and pulled tentatively. Sometimes the unexpected happens and the head progresses. But if this does not happen we quickly abandon the attempt. We recommend you to send or go and fetch your Skutsch's pelvimeter, as well as your instruments for perforation; to measure the pelvis and to try Müller's method of pushing the head into the brim, so that you may be able to treat the case on the principles laid down under contracted pelvis.

When to perforate. If the child is dead and delivery is indicated, perforate if the conjugate of the brim is not under two inches. When the conjugate of the brim is under two inches you may be able to pull a perforated child through with the help of cleidotomy; but the maternal mortality of such an operation is very high, and Caesarian section is as safe or safer.

Should you ever perforate a living child? In this hospital a living child has not been perforated for a great number of years, nor have we ever had to sacrifice a child in this way in private practice. We prefer Caesarian section or pubiotomy. When maternal symptoms become urgent, the child

is, we think, nearly always dead. But we do not wish to dogmatize on this difficult question.

Instruments. We think Winter's combined cranioclast and cephalotribe is the instrument of choice, but we describe the operations with the separate instruments. You will also want
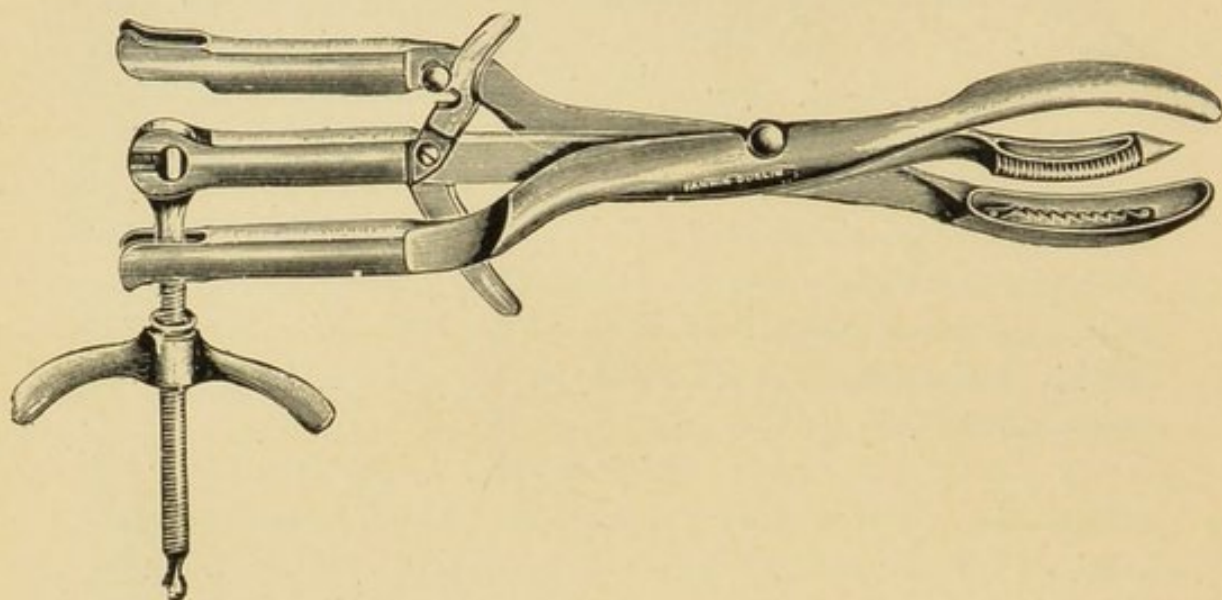
FIG. 145. Winter's combined perforator, cephalotribe and cranioclast.

a douche, a large Bozemann, a vaginal nozzle, perhaps a crotchet, bullet forceps, a catheter and a Simpson's perforator.

Preparation. The patient is put under chloroform and in the cross-bed position. It is essential in this operation to be absolutely surgically clean. The patient is exhausted and it
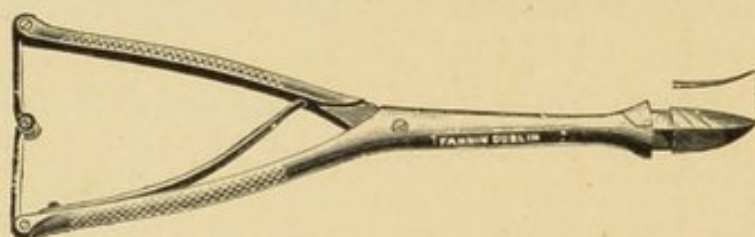
FIG. 146. Simpson's perforator.

has been definitely proved by bacteriologists that exhaustion greatly lowers a patient's resistance to microbes. The broken bones have sharp points and they tear the soft parts. The perforator may slip and injure the soft parts. Often the os is not fully opened and so the cervix gets torn. It is a rough and somewhat brutal operation, in which parts are most likely to get lacerated and offer channels for infection in a

woman already less able to oppose microbic infection. Shave, then, the vulval and pubic hair. Wash the skin of the vulva, pubes, and groin most thoroughly with soap and water. Wash off this soap and water and put over the parts a pad of lint wrung out in biniodide of mercury, while you again cleanse your hands and put on your boiled rubber gloves.

Then wash the muco-cutaneous surface of the labia minora with soap on balls of wool, held on tongue forceps, scrubbing vigorously. Take a piece of soap and with two or three fingers scrub the vagina vigorously, following this by a prolonged douche with creolin solution. Empty the bladder with a catheter.

The perforator. To perforate successfully, once more we advise you to remember the golden rule of putting your whole hand, if you can, and if not, your half hand, into the vagina. Make sure that the head is presenting by feeling a suture or fontanelle. Get the nurse or an assistant to press the head down towards the pelvic cavity, thus getting artificial fixation of the head whilst you perforate and extract, for if the head shifts after you have made a hole in it you may not easily find the hole again. We pass the perforator up to its shoulder, through a fontanelle, suture, or bone, as is easiest. Bore a little with the point to get it through the bone. Having pierced the skull and buried the perforator up to the shoulder, surround the instrument with your fingers, still touching the head. Do this to recognize the amount of work you are doing with the instrument. Then open the instrument. Close it again, turn it round a quarter of a circle, and open it again. Your fingers, as we have said, tell you whether you have made a sufficient hole. One more step we advise you to take, namely, to push the perforator through the hole up to the medulla of the child. We hope and think that we shall never have to perforate a living child, but it is possible one might decide a baby was dead when it was really alive. When the child is born and the medulla is not destroyed, the child cries, and this must be a horrible experience, which can be prevented by pushing the perforator on to the medulla and turning the point of the instrument round in the soft medullary nerve matter.

Washing out the brain. The next step is to withdraw the perforator and douche out the brain matter. Pass a large Bozemann's catheter through the hole in the skull and break up and douche out the brain matter.

Extraction with the cranioclast. It is not difficult to fit the cranioclast. Take the inner blade, and, guiding it with your fingers in the vagina, push it through the hole in the skull as far up as it will go. Take the other blade and push it up outside the skull, where there is room. The lock is similar to that in forceps. If the blades do not lock, tell the nurse to refrain from pressing the head down. Keeping the outer blade in its place, turn the inner blade so that they will lock. The head will probably spin round with the inner blade. Screw the blades together and pull. Feel with your fingers for any sharp spicules of bone and prevent them as far as you can from lacerating the vagina. If the head will not come through, spin it round in another position and pull again, but don't twist and pull at the same time. Pull it in the position in which it descends most readily. Remember, too, that further advance after some descent may be prevented by the shoulders. If this is so, pass up stout scissors, and, directing their action with your fingers, cut through the clavicles.

When the pelvis is very small the head cannot be extracted without breaking it up more completely. Catch a piece of the vertex with the cranioclast, twist it off and remove it. Catch another piece and remove the vault piece-meal in this manner. Feel carefully each time you fit the instrument that no maternal part such as the cervix is caught. Then catch the base of the skull between the blades of the cranioclast, crush it and extract the foetus.

Extraction with the cephalotribe. You put the blades on as you would put on forceps, making the top of the blades reach up to the child's neck. Get them one on either side of the widest diameter of the head, else they will slip as you screw up. You lock the blades as you lock forceps. Screw up tightly and pull the child out, pulling in the axis of the pelvic cavity, as far as you can judge of it.

Extraction with Winter's combined cranioclast and cepha-

lotribe. This is the most effectual instrument. You first put on the cranioclast and usually that will suffice. If it does not, fit the cephalotribe blade and crush the base of the skull with it. This is easier than with the cephalotribe only, for the cranioclast keeps the head steady and prevents it from slipping whilst you fit the cephalotribe blade. Study the instrument before using it, so as not to get confused by the fitting of the three blades.

Perforating the after-coming head. You are advised to perforate through the roof of the mouth, for the front part of the head is said to collapse first, and flexion is increased. Some perforate through the occiput.

Perforating the separated head. Sometimes in extraction of difficult breech and in decapitation the separated head is left in the uterus. As a rule it is easy to extract by getting an assistant to press it into the pelvic brim, by putting your whole hand into the vagina, putting forceps on to the head and extracting. The brain matter escapes as you extract and makes the head small. If this fails you can keep the head still by fixing it with the crochet or hook which you pass into the child's eye or mouth, or you can use bullet forceps. Then adjust your cephalotribe. If you use the cranioclast you should get the vertex over the os and perforate.

Douching the uterus. After perforation the uterus and vagina must be thoroughly douched.

EVISCERATION

Sometimes delivery of a dead child is delayed by an abnormally large chest or abdomen. If the chest is the cause of delay and cutting through the clavicles with stout scissors fails to effect delivery, get the nurse to pull or push the child down as far as possible, so as to get the chest within reach, then, directing your stout scissors with two fingers in the vagina, open the chest. Then take out the viscera by passing your whole hand into the vagina. If the child's swollen abdomen is the cause of delay, clear out the abdominal viscera in the same way. Douche the uterus

thoroughly after evisceration.   Have the patient under
chloroform both to save her pain and the repulsive sight of
a mangled child.

COMPLETE PERINEAL TEAR

When the tear extends through the mucous membrane of
the rectum, sew it up carefully, and at once, to avoid incon-
tinence of faeces.

Give the patient chloroform, if she is not already under
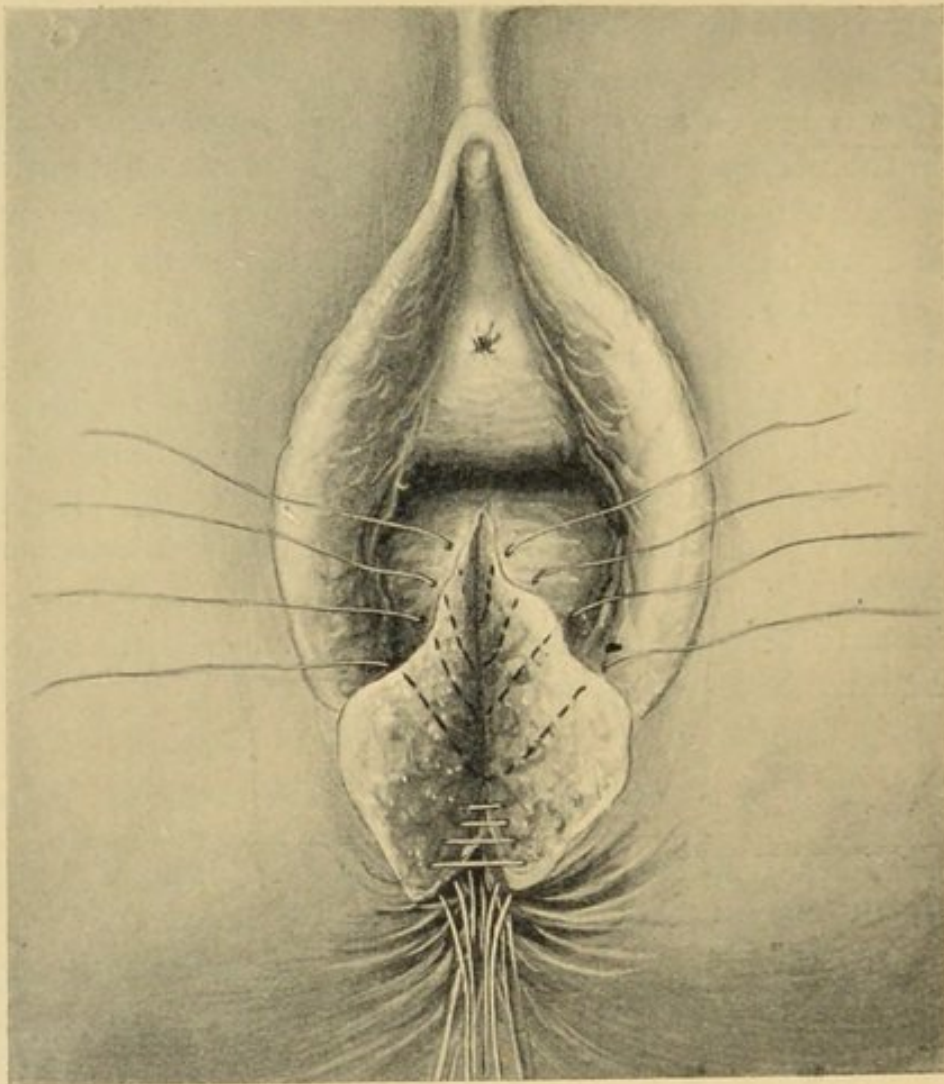
FIG. 147. Suturing a complete tear of the perineum.

its influence. Put her in the cross-bed position with her
buttocks well over the edge of the bed. Douche the parts
clear of blood.

Uniting the rectal mucous membrane. This you do by interrupted catgut sutures, which are passed and tied so that the knots are left in the lumen of the bowel.

You pass the first at the upper angle of the mucous membrane tear. Take a fine cervix curved needle, armed with catgut. Pass it first from the rectal lumen through the edge of the mucous membrane at the upper angle of the tear, then through the opposing edge from without into the lumen of the bowel. The suture thus starts from, and ends up within, the lumen of the bowel. Consequently when the knot is tied it is in the bowel. You can tie and continue with the next, or put in as many as are necessary to restore the mucous membrane tube one after the other, and then tie first the highest, then the next, and so on. The catgut sutures melt away within the week.

The sphincter ani and perineum. These are now sewn up in precisely the same way as an ordinary perineal tear with salmon gut sutures.

After-treatment. We give the patient tincture of opium ꩜ x t.d.s., and give her no food, but albumen water until the fifth or sixth day. The bowels are then opened by small doses of Mist. Sennae Co., and a soap enema of one pint or olive oil half a pint. The faecal mass formed by albumen water is very small, that from milk bulky. Take salmon gut stitches out on the tenth day. The baby may have to be spoon fed for a few days, if the milk does not flow freely.

If there is failure to unite or a fistula. The patient is kept in bed about three weeks. Then a gynaecological operation becomes necessary to restore her to health. Granulating surfaces unite well if brought together; and so you can again put in sutures on the eighth or tenth day after failure. Should failure again occur, further operation should be deferred for six weeks. Fortunately the primary operation is usually successful.

PART IV

THE ABNORMAL PUERPERIUM

CHAPTER XV

GENERAL PRINCIPLES OF PUERPERAL INFECTION

Puerperal infection. With the exception of nervous influence, we hold that whenever the temperature of a puerperal woman rises above 99°, excepting the first twenty-four hours of the puerperium, she is in some way infected either by microbes, or by the products of retained lochia.

We will, therefore, first dispose of nervous temperatures, and then we shall be free to deal with the important subject of puerperal infection.

Nervous temperatures. In rare cases, when no other cause can be found, we are compelled to attribute the rise of temperature to nervous influences. For example, we recently had a patient in hospital who was visited by her husband on the fourth day at 3 p.m. Her husband spoke sharply to her on some subject, and she was upset. At 5 p.m. her temperature, which had been normal, was 103° F., but her pulse was under 100. Nothing was done, and by 10 p.m. her temperature was again normal. Again, in hospital we notice that slight rises of temperature are more common on visiting than on other days.

The causes of puerperal infection and their importance. It is now generally acknowledged that the causes of puerperal infection are microbes, which gain entry to the parturient canal. The commonest way in which they gain entry is from non-sterile fingers or instruments, or they are carried up by sterile fingers or instruments from labia minora that have not been efficiently cleansed. In other words, puerperal

infection (certainly all infection of a serious nature) is to be attributed to failure on the part of the nurse or medical attendant to preserve strict cleanliness. For example, whenever we get a bad case of sepsis or a series of minor cases in hospital, a careful investigation is made as to how the patient was attended at birth, whether washing was sufficient, whether
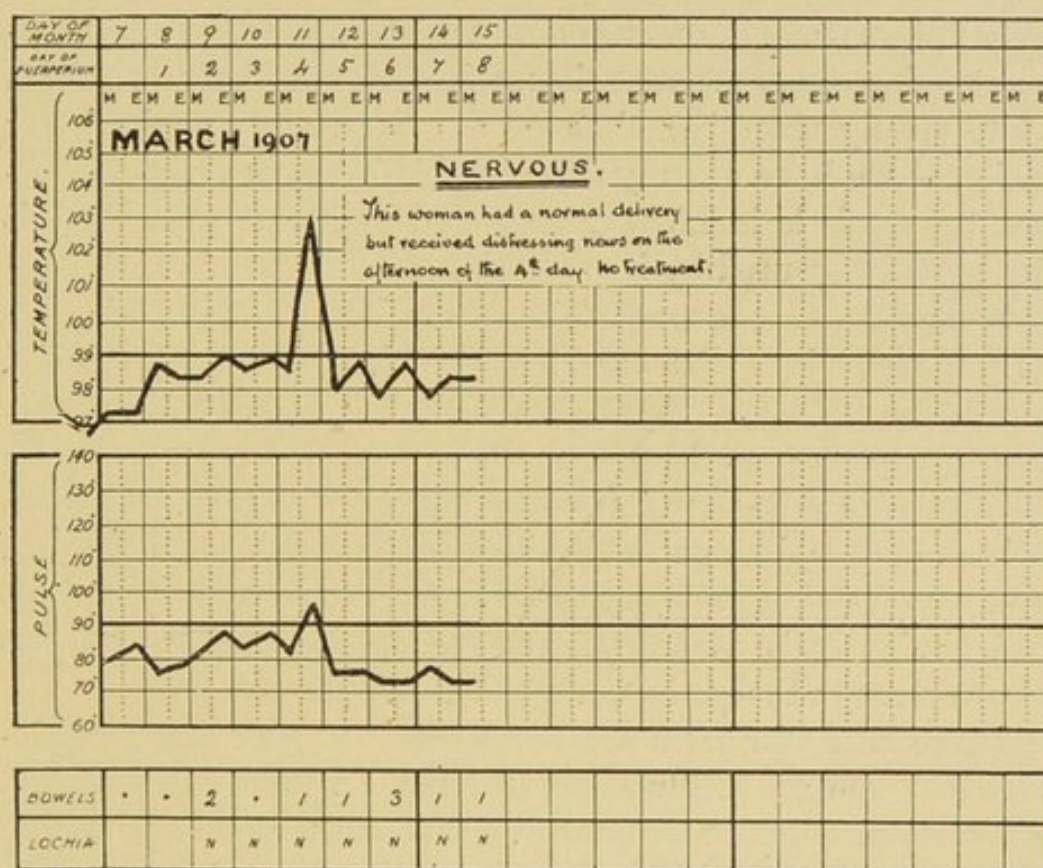
FIG. 148. Temperature due to nervous influence.

the nurse has any other cases of infection, any sore on her hands, &c., and the patient is cleansed with swabs held on forceps by the nurse, lest she should carry the infection to other cases under her charge. So, too, every patient has separate numbered utensils, towels, mugs, basins, &c. The bedding of a patient who has had sepsis is steam sterilized before it is again used. Gloves, too, are always worn by us in attending in any way to any puerperal patient's genitalia. We only give these as examples of the care that is needed in hospital to prevent sepsis in any form arising, and we maintain that, were a like care exhibited in private cases

by practitioners, puerperal sepsis would not still be the scourge it is shown to be by the Registrar-General's returns. Nor can the mortality of puerperal infection be regarded as a true guide to the extent of its ravages. It is doubtful whether a woman ever completely recovers from an attack of puerperal sepsis. Definite defects, such as twisted tubes, chronic metritis, endometritis, adhesions, retroversion, chronic pyosalpinx, or more obscure ailments such as frequent or constant pains, are found, and the mother says she has never been quite strong since the birth of the baby. We emphatically insist, as we have already done in this book, that the seriousness of sepsis is in no way measured by its mortality, and is far better measured by its morbidity.

Microbes of puerperal infection. The common microbes of puerperal infection are streptococci, staphylococci, bacilli coli and gonococci. Saprophytes, too, take part in sapraemia. The prevalence of these organisms need not be urged. All of them are constantly attacking the health of human beings, and in human habitations streptococci, staphylococci, and bacilli coli are always to be found. Infection by bacillus coli obviously is a constant danger, considering the nearness of the anus to the perineum and vulva.

These microbes often act in concert. Thus a shaggy endometritis, due to bacillus coli associated with streptococci, is a condition of extreme danger. Gonococci alone are seldom dangerous, but when associated with other microbes their virulence is greatly increased.

Other microbes cause puerperal sepsis, but the above are by far the most frequent.

Pabula of the microbes. Microbes live readily in lochia; they live readily on dead material such as retained bits of placenta, membrane or blood clot. They live, too, on raw surfaces. The intact mucous membrane of a normal vagina and cervix forms an insuperable barrier to the passage of microbes in sufficient force to cause infection. After labour the mucous membrane is bruised and lacerated, and is no longer the barrier that it normally is.

General principles of puerperal infection with especial regard to treatment. Microbes cause puerperal infection,

and the reason why a patient recovers is that she is able, either with, without, or in spite of her attendant's treatment, to overcome and destroy the infecting microbes. Microbes poison the body by their toxins; the body depends on the presence and manufacture of protective substances to kill the microbes and neutralize the poisons.

The researches of Lord Lister and his successors have taught us how we may best prevent the entry of microbes and ward off infection. But in this chapter we are dealing with cases in which for some reason the prevention has failed and the body has now to defeat the microbes. Clearly, as nearly all cases end in eventual recovery, the body is able to overcome the microbes. Two questions of practical importance arise: How does the body overcome the microbes? and, In what way can we aid its efforts?

The most recent work of bacteriologists shows that the body opposes the attack of microbes mainly in three different ways:

1. By means of substances in the serum of the blood that kill the microbes directly—the bactericidal substances.

2. By the presence in the serum of the blood of substances which have been named opsonins by Sir A. E. Wright, from the word *opsono*, I cook, I prepare for the table. These substances combine with the microbes and alter them, so that the phagocytes can eat them up.

3. By the elaboration in the blood serum of antitoxins, substances that combine with and neutralize the toxins of the microbes.

Of the common microbes of puerperal infection, streptococci, staphylococci and gonococci are not much affected by bactericidal substances, but are readily opsonized and ingested by phagocytes. Bacilli coli are killed by bactericidal substances and opsonized. The toxins of all are neutralized in the body by antitoxic substances.

It may also be stated, as a law of the body's reaction, that when a patient is overcoming the microbes the protective substances in the blood are in excess of the normal amount of the protective substances. In other words, when microbes attack the body, the body, unless entirely overwhelmed by the

violence of the attack, responds by manufacturing a large amount of specific antibacterial substances with which to combat and destroy the microbes. Sir A. E. Wright has shown that if a dose of dead microbes is injected into the body, at first the power of resistance falls below, and then, with reaction, rises above, the normal. He has named the fall the negative phase and the rise the positive phase. Clinically the negative phase corresponds with the feeling of illness and the rise of temperature and pulse that result from microbic infection, and the positive phase with the feeling of betterment and fall of temperature and pulse that result from the body's successful reaction.

The practical questions of treatment are—

1. Can we help the bactericidal action?
2. Can we help the opsonic and phagocytic actions?
3. Can we help the antitoxic action?
4. Can we help the supply of the body's antibacterial substances to the affected part?
5. Can we prevent further attacks of the microbes?

Can we help the bactericidal action? The answer to this must be tentative. Laboratory experiments give hope that by the injection of vaccines, composed of a stated number of dead bacteria, the manufacture of these substances may be augmented. But at present this method is not one of practical therapeutics.

Marmorek's antistreptococcic serum is a bactericidal serum. In practice it has not proved to be of any value.

Can we help the opsonic and phagocytic actions? Vaccines again promise to be of value, but at present their use in acute cases has not been determined. There are, however, several substances which, given to the body, increase the number of leucocytes. Credé introduced the use of collargol, an organic compound of silver, with this object. It can either be injected into the veins in doses of one to two grains in water once a day, or ʒj of Credé's ointment (collargol gr. xvij to ʒj of lard) may be rubbed into the thigh once a day, the remnants of the previous inunction first being washed off with soap and water. Credé has strong belief in its power and we always use it in severe sepsis and think it does do good.

Can we help the antitoxic action ? Many antitoxic serums have been prepared. Lately polyvalent antistreptococcic serum, which, however, is probably rather a bactericidal serum, has aroused most interest. Personally we have found antitoxic serums disappointing, but we do not advise against their use.

It is necessary to discover the presence of streptococci or staphylococci in the uterus before using the serums. The distinguishing of bacillus coli must be left to bacteriologists, though the presence of a bacillus in the uterine lochia, with a shaggy endometrium and foetid lochia, is clinically diagnostic of its presence.

How to procure the uterine lochia and examine it. (1) A posterior speculum, (2) a pair of bullet forceps, (3) some sterile wool, (4) a piece of glass tubing, with a slight bend, about the same size as a female catheter, previously sterilized in a test-tube, (5) a syringe and piece of rubber tubing which have been boiled and can be attached to the glass tube, are the instruments required.

The patient is in the cross-bed position. No anaesthetic is needed. The vulva is cleansed, but the vagina is not douched. Your own hands are clean and gloved, and your apparatus is in a sterile dish and boiled water on a chair. Insert the posterior speculum. Catch the anterior lip of the cervix with the bullet forceps and pull the cervix down. Give the bullet forceps to the nurse to hold. Wipe the cervix clean with the sterile wool. Pass the piece of glass tubing into the uterus as far as you can. Fasten on the rubber tubing and syringe, if you have not already done so, and suck some of the lochia into the glass tube. You can drop a few drops of lochia on to glass slides at once or seal both ends of the piece of glass tubing with sealing wax and send the lochia to a bacteriologist. By spreading the lochia thinly on the slides, letting the lochia dry, fixing by passing three times through a Bunsen flame and staining for ten minutes with methylene blue, you can with the microscope detect streptococci, staphylococci, diplococci or bacilli.

Use of antimicrobic serums. Serums against streptococci and staphylococci are on the market. We have not ourselves used any other specific serums. These serums are injected into

the patient's loin. 10 cc. to 20 cc. is the dose every twenty-four hours. The effect on the temperature is carefully noted. If the serum is without effect after three doses, it is no good continuing its use.

The dilution of the toxins by the infusion of salines. As regards diluting the toxins by infusion of salines or large rectal salines, such dilution must also dilute the antitoxins. At present we have no knowledge as to whether a diluted antitoxin has more chance of neutralizing a diluted toxin than an undiluted antitoxin has of neutralizing an undiluted toxin. Until we know this or until practical experience proves the value of saline infusions—and it has not yet done so—we do not recommend this treatment. Personally we have never seen any good result from them

A patient with sepsis is thirsty. Let her drink abundantly of water, so that the excretion of her urine and flushing of her body may be efficient.

Can we help the supply of the antibacterial substances of the body to the affected part? We have seen that our power of helping the manufacture of these antibacterial substances is practically nil, but we have some power over the supply of the body's antibacterial substances to the affected part. The substances are supplied by the blood stream. We have means by which we can increase the flow of blood to the uterus and pelvic organs.

Inflammation itself brings increased streams of blood to the regions of microbic attack. If the intensity of the microbic poison is very great, stagnation of the blood supply results and the phagocytes and antibacterial substances of the serum are unable to reach and overcome the microbes. The amount of lochia is a test of the amount of serum that is washing over the infected uterine wall. In severe cases of sepsis the lochia dries up. The significance of this scanty lochia is clear and is of evil omen.

Methods of increasing blood and lymph supply to infected uterus. When, therefore, in a case of acute sepsis the lochia decreases or dries up, it seems rational to use means to again make it flow freely.

The only efficient local treatment which draws blood to

the part is the hot vaginal douche. Douches for this purpose are given night and morning. The douche can is not raised more than two feet above the patient's bed, so that none of the douche fluid enters the uterus.

Another local method has been introduced by Bier. Bier draws blood to the cervix by modifying a breast pump to fit the cervix. The funnel and stem are made of stout glass and the ball of strong rubber.

Citric acid has the power of increasing the transudation of blood and lymph through the tissues and of helping their flow through the vessels by diminishing the coagulability of the blood. One drachm of citric acid given every three hours for twenty-four hours to a normal person sometimes results in nose-bleeding and subcutaneous haemorrhages. We have given one drachm every four hours in hospital and half a drachm four-hourly in the extern department to septic cases, in which the lochia has dried up, until a free discharge of lochia was established. It is difficult to say whether it did good, for we have not had many cases in which to try it. All that can be said is that it seemed to do good and the patients like it. It should not be given if the lochia is abundant.

Another method of treatment, recommended by Prior, in cases of acute sepsis seems to have for its rationale the removal of lymph that has flowed over the microbes and been deprived of its antibacterial substances, and its replacement by a fresh flow of lymph. Prior opened the peritoneum through the posterior fornix, let out the stagnant peritoneal fluid and then stuffed Douglas's pouch with iodoform gauze. The gauze would by irritation produce a further flow of lymph and limit the spread of inflammation by young adhesions, which are well channelled by lymph passages. We recommend that this treatment should be tried in the desperate cases described under acute lymphatic sepsis.

Can we prevent further attacks of the microbes? Here we have more scope. We can prevent, by the scrupulous cleanliness of our douching and examinations, the entry of further microbes and the added danger of a mixed infection. Above all, if anywhere in the genital track there is a pabulum on which microbes can grow and multiply, and

this pabulum is removable, we should remove it. Otherwise it forms a base from which fresh hosts of microbes can issue to attack the body. The power of the body to overcome these added numbers has to be greater in proportion, is often severely taxed, and may be entirely overcome.

For this reason, if there should be a puerperal ulcer, it is thoroughly cleansed by strong antiseptics.

If there is no ulcer, lochia retained in the vagina must be washed out of the vagina by a vaginal douche. Lochia retained in the uterus, owing to anteflexion or retroflexion, must be let out by straightening the cervical canal, followed by an intra-uterine douche and a gauze drain. Remnants of afterbirth, with the crowds of microbes that are growing upon them, must be removed by manual exploration of the uterus.

Finally, rest in bed prevents inoculations from the microbic area that follow its disturbance by exercise.

CHAPTER XVI

KINDS OF PUERPERAL INFECTION

Breasts—Constipation—Retained Lochia, Vaginal—Uterine —Puerperal Ulcer—Perineum—Retained Membranes— Sapraemia—Putrid Endometritis—Acute Lymphatic Sepsis—Peritonitis—Acute Venous Sepsis—Pyaemia— Phlegmasia Alba Dolens—Inflammation of the Breasts.

HAVING described the general principles of puerperal infection we now proceed to detail the various kinds of puerperal infection and apply the above principles to their treatment.

Examination of a puerperal woman with fever and rising pulse. At every visit you take the patient's temperature and
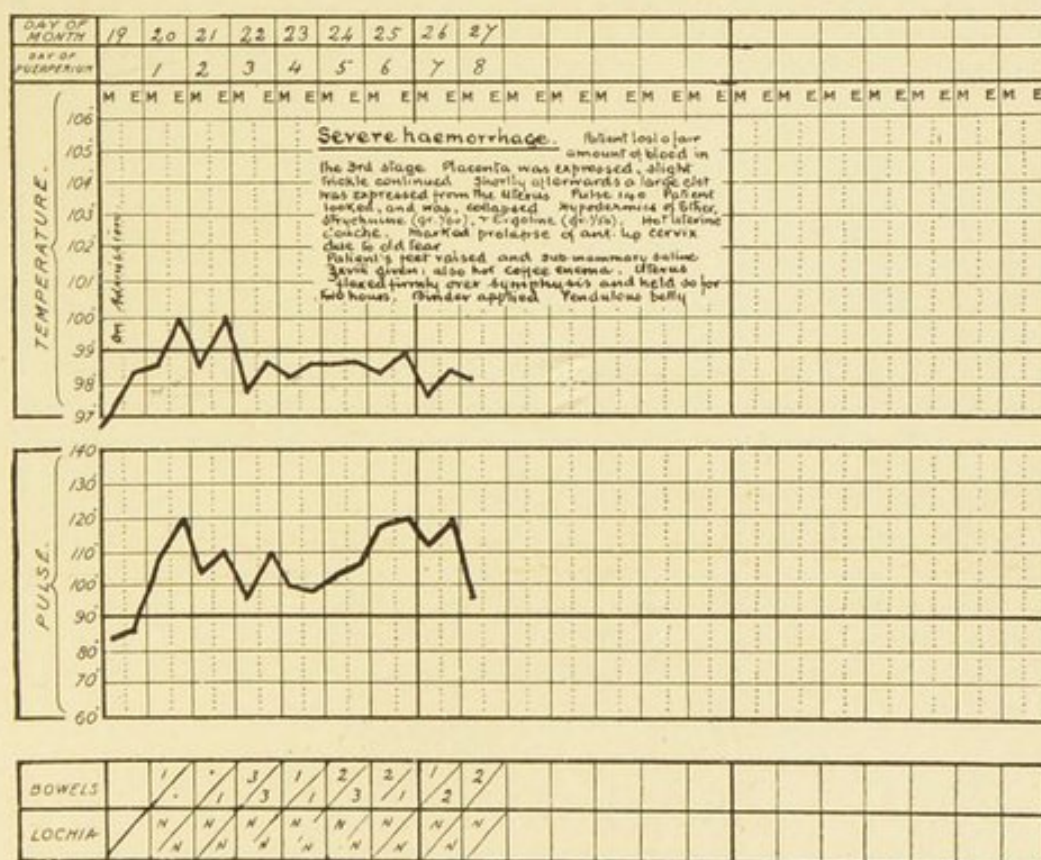
FIG. 149. Chart of severe haemorrhage. (Notice Pulse Chart.)

pulse; look at her tongue; examine the pads on which the lochial discharge has been collected; look at the breasts; and note the height of the uterus above the pelvis and the condition of the perineum and vulva. If she has a temperature taken in the mouth above 99° or a pulse above 90, look for some cause. Unless the rise is very trifling you should find some. But remember that your patient may have some general illness, such as phthisis. Great bleeding at delivery may give the pyrexia of haemorrhage and the quick pulse. Even though she has some general disease, do not be satisfied that this is the cause of the temperature until you have excluded the far commoner cause of puerperal infection.

THE BREASTS

Sometimes from the third or fourth day onwards you find the breasts hard, knotty and tender with or without flushing of the superficial skin. Mastitis, or inflammation of the
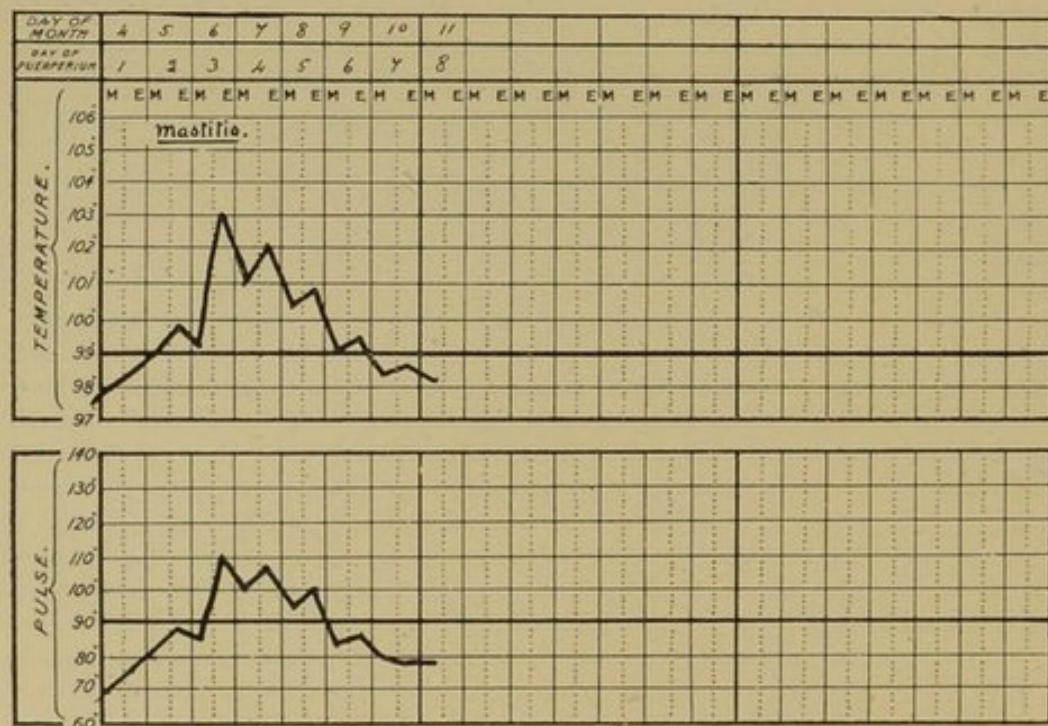
Fig. 150. Chart of mastitis.

breasts, is present and causes a rise of temperature and pulse. We deal with mastitis later on, but we mention it here as a cause of raised temperature and pulse, to warn you not to

attribute raised temperature to 'milk fever' unless the signs
of mastitis are definite and the signs of pelvic infection are
absent.   There is no other sort of fever arising from the
breasts, except that due to mastitis.   The 'milk fever' which
is supposed to occur on the third or fourth day owing to the
filling of the breasts, is not milk fever at all, but is some form
of puerperal pelvic infection.   The very great majority of our
patients get the breasts filled with milk without any rise of
temperature or pulse whatever.   When there is a rise at this
time we always find it is due either to uterine or vaginal
infection or other definite cause.

NERVOUS INFLUENCES

We have already dealt with this, as a cause of raised
temperature.

CONSTIPATION

The concurrence of constipation and a raised temperature
and pulse in the early days of the puerperium is very frequent.
We have had a patient with a sudden rise of temperature to
104° and pulse to 120, both of which fell to normal after the
bowels had been opened.   The reason usually stated for this
pyrexia is that a puerperal woman absorbs toxins from her
faeces, which a normal woman does not.   We are doubtful as
to whether this is the explanation.   In the lying down
position in bed which is assumed by puerperal civilized
women there is not the free drainage of lochia from the uterus
and vagina that there is in the native woman, who goes about
her business after delivery is finished.   When the bowels of a
patient are opened in hospital, she sits upon the chamber in
bed, and thus provides a freer drainage of her lochia by
gravity.   The action of the abdominal muscles, the peristalsis
of the rectum, and the straining, also tend to squeeze out the
lochia.   We give our hospital patients a dose of black draught
on the second night after the delivery, and we encourage a free
action of the bowels, necessitating frequent sittings-up on the
chamber.   In private practice we do not object to our patients

sitting upon the chamber in bed in order to evacuate the
bowels. For the same reason we tell patients to turn over on
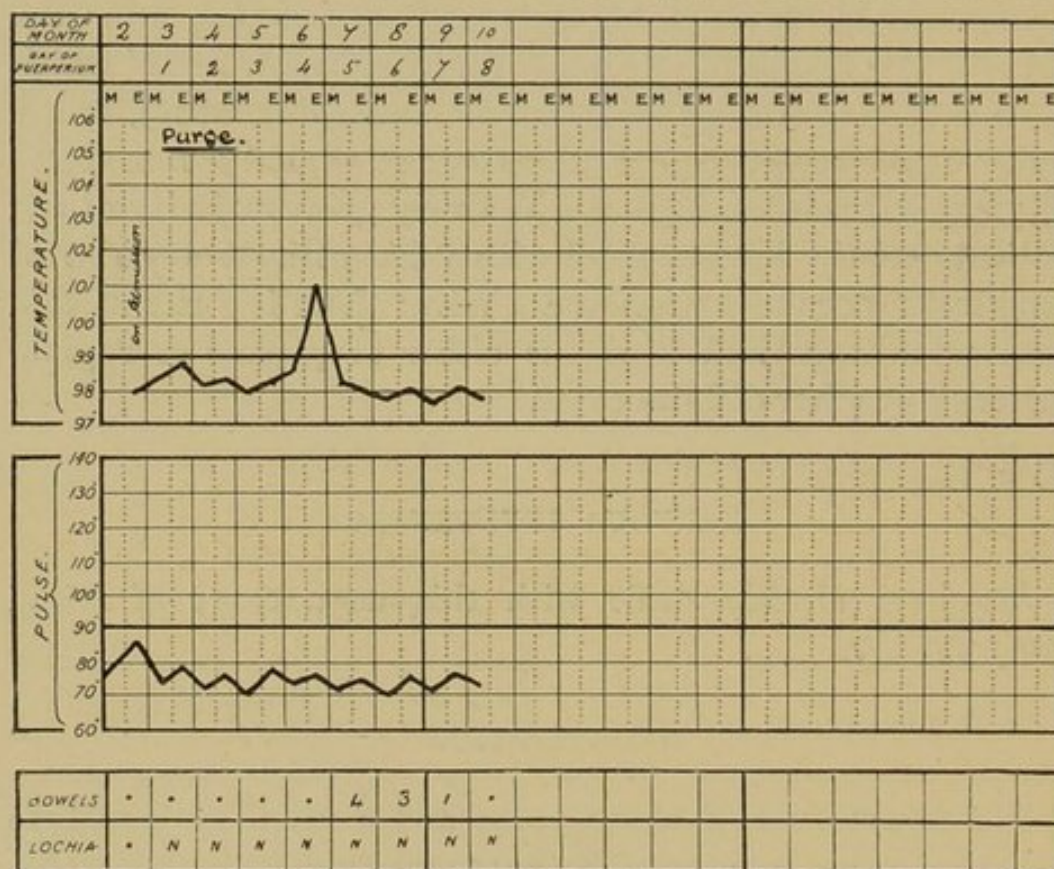
FIG. 151. Effects of purge on temperature curve. (Notice Pulse Chart.)

the hands and knees to pass water in the first twenty-four
hours, unless they have suffered from shock or collapse.

RETAINED LOCHIA IN THE VAGINA

The vagina of many puerperal women is very capacious, and,
in the recumbent position, lochia tends to collect in a pool in the
floor of the upper part of the vagina. Especially is this likely
to be the case after the perineum has been stitched. This
retained lochia tends to become foetid. The pulse quickens
and there may be a slight rise of temperature owing to septic
abortion.

Treatment. If we find the temperature a little raised and
the pulse a little quick, with foetid lochia, we first try the
effects of raising the head of the bed about one foot on
blocks.

FIG. 152. The bed now used at the Rotunda.   It is raised or lowered
by turning the wheel.

FIG. 153. Effect of raising bed. Sapraemia.

Quinine and ergot. Both of these drugs have the power of making the uterus contract, so in these cases and in other cases of temperature, which is not accompanied by constitutional signs of any note, we give a single dose of quinine gr. x. It is a good general rule, too, in all cases of puerperal infection to give ʒj of Squibb's ergot night and morning. Both of these drugs are given for the above reason solely. Involution in these cases is frequently deficient and ergot opposes this deficiency by making the uterus contract.

Vaginal douche. If the signs have not abated within twelve or twenty-four hours, we give the patient a vaginal
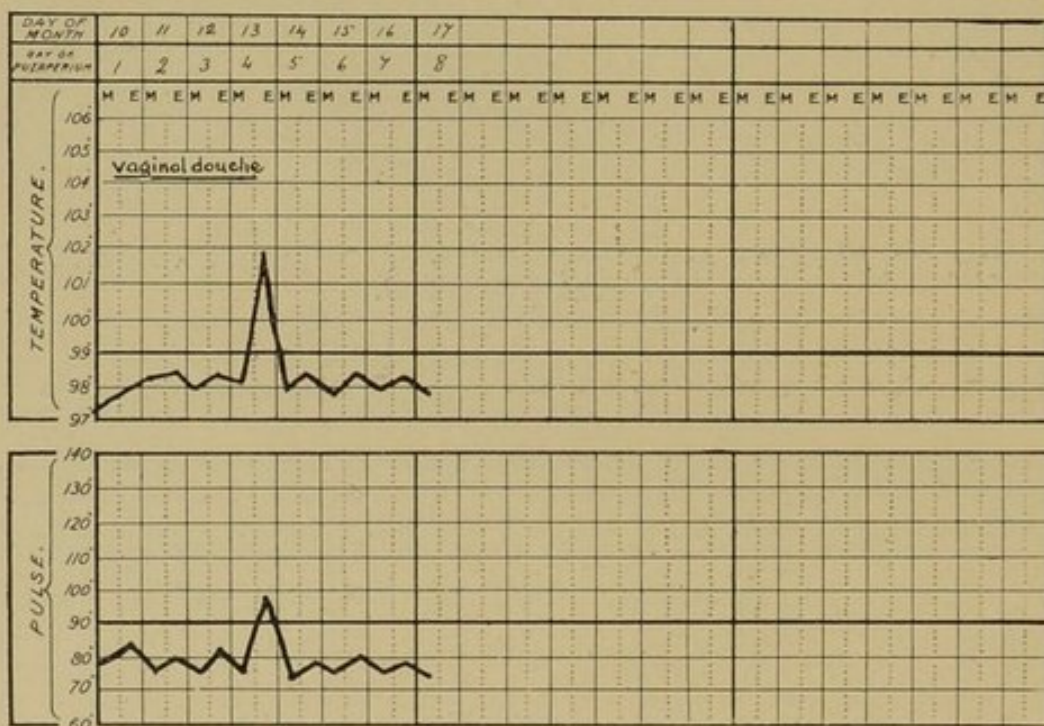
Fig. 154. Effect of vaginal douche. Sapraemia.

douche. The warmth of the vaginal douche has the additional merit that it makes the uterus contract. While giving the douche we make a vaginal examination to see if we feel the fundus of the uterus sunk into the anterior vaginal wall (anteflexion) or posterior vaginal wall (retroflexion).

If the case was one of vaginal retention, this douche suffices, but we still keep the bed raised.

RETAINED LOCHIA IN THE UTERUS

It is not uncommon after the fourth day to find the uterus acutely anteflexed. Retroflexion also occurs, but it is less common in our experience. The heavy fundus falls forward on the soft lower uterine segment as on a hinge. The cervical canal is sharply kinked and the lochia collects in a pool at the fundus.

Diagnosis. You are sometimes able to diagnose acute ante-
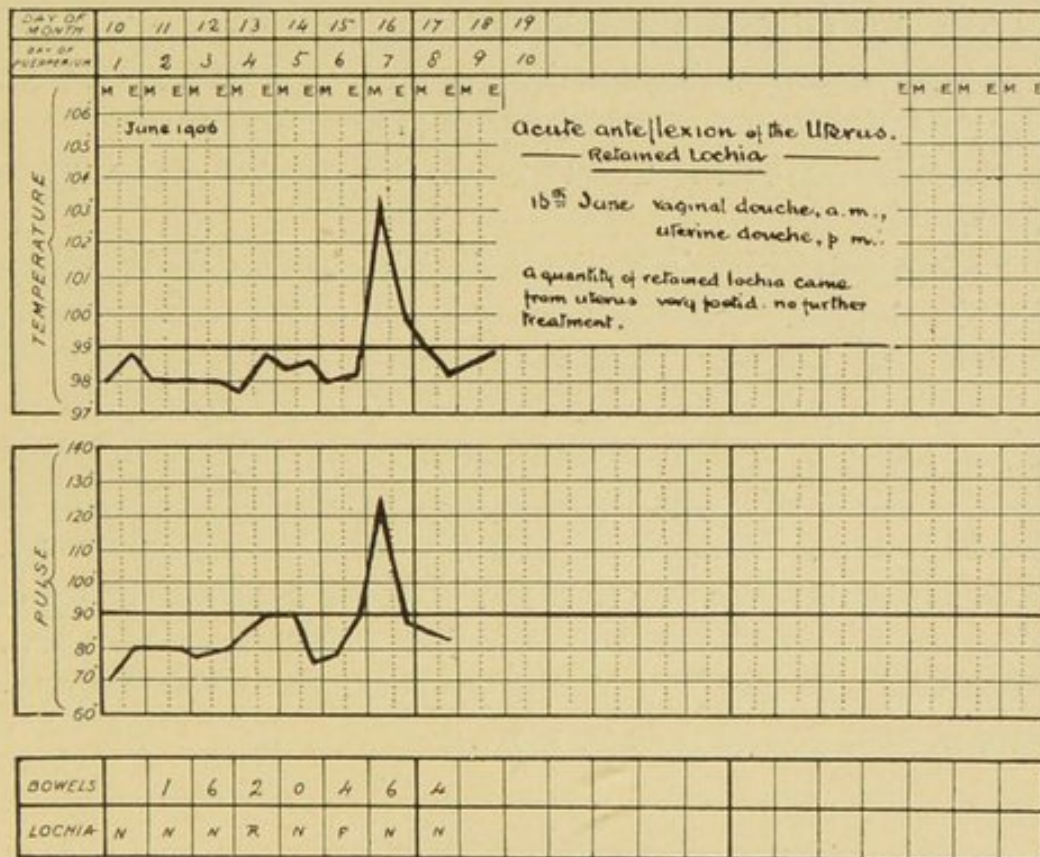
Fig. 155. Retained lochia.

or retro-flexion by the sudden dropping of the uterus, as felt abdominally. One day, for example, you feel the uterus a finger's breadth or so below the umbilicus, and the next day you cannot feel it at all, or find it almost at the level of the pelvis.

When you give a vaginal douche, because the temperature and pulse have not fallen with purge, quinine, and raising the head of the bed, you make a vaginal examination, and in these cases you feel the body of the uterus sunk into and

bulging the anterior vaginal wall. The cervix is high up in the vagina. You put two fingers or the half hand into the vagina and insinuate one gloved finger into the cervical canal, and you find you cannot get your finger into the uterus. You persist, hooking the finger a little, so as to pull the cervix down. Your finger passes the kink, straightens out the cervical canal, and at the same time some putrid lochia runs out of the uterus.

Or you may have decided to give an intra-uterine douche, and you find that although your large Bozemann's catheter enters the cervical canal, it does not pass readily into the uterus. On examining for the cause of the obstruction with your finger you find the kinking of the cervical canal.

Retroflexion of the uterus presents the reverse picture to the above.

Treatment. You have the patient in the cross-bed position for the douche. After straightening out the cervical canal, douche the uterus. Then take a sterile piece of iodoform gauze in your plugging forceps, soaked in hydrogen peroxide of the strength of five volumes, and, guiding the forceps with two fingers in the vagina, pass it through the cervical canal up to the fundus. Remove the gauze within twenty-four hours. Anteflexion is not likely to recur. If the temperature again rises and if anteflexion or retroflexion recur, repeat the above treatment. As long as drainage keeps the pulse and temperature normal you need do no more.

PUERPERAL ULCER

Always before douching a patient examine the perineum and neighbouring parts of the vagina to see if a puerperal ulcer is present. In clean midwifery puerperal ulcer is very rare. A puerperal ulcer is an angry-looking ulcer with raised edges and dirty green discharge or a greyish white membrane. The labia are often much swollen.

Treatment. Avoid all douching when a puerperal ulcer is present, for fear of carrying its virulent microbes up into the parturient canal. Remove any perineal stitches, and paint

the ulcer with pure carbolic acid.   If there is much oedema round the ulcer hot boracic fomentations changed four-hourly
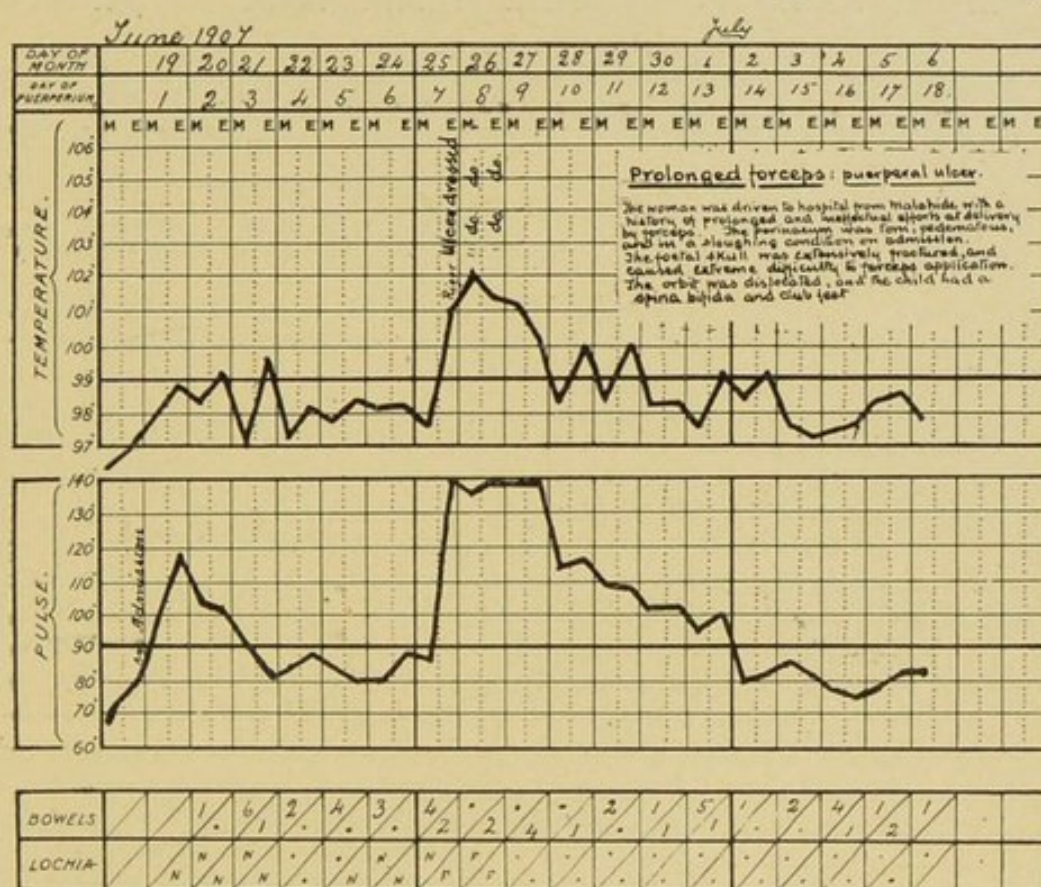
Fig. 156. Puerperal ulcer.

are good.   In short the treatment is not different to the treatment of other foul ulcers.

UNHEALTHY PERINEUM

After a perineum has been sewn, one usually finds a little whitish discharge upon its surface, which is of no moment. Sometimes when the stitches have not reached the full depth of the wound, a pocket is left in which blood or lochia may collect and decompose, forming a small abscess tender to pressure.

Treatment.   Take out the stitches and cleanse the wound with biniodide of mercury and iodoform powder.

RETAINED MEMBRANE OR PIECE OF PLACENTA. SAPRAEMIA

Diagnosis. When the afterbirth is delivered, you may find on examination that some membrane is left behind in the uterus. You leave it, because it commonly comes away in the lochia in a few days and causes no trouble. But if the
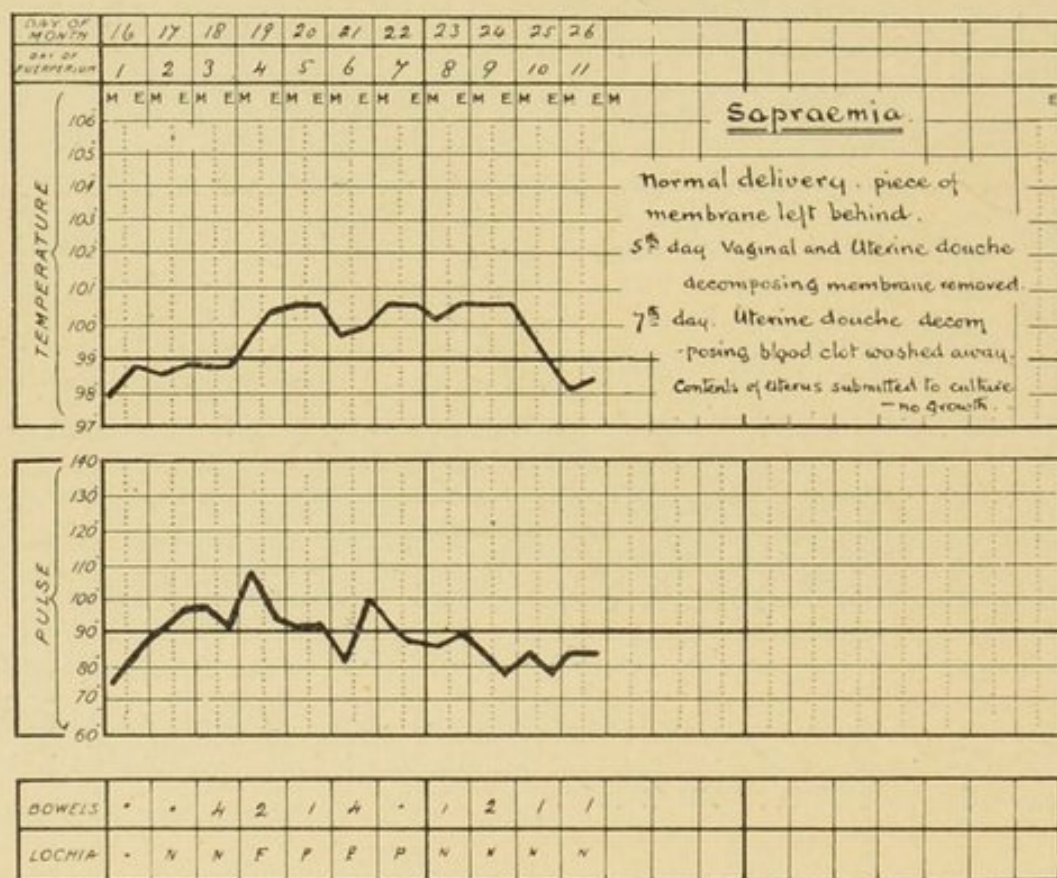
FIG. 157. Sapraemia. Retained membranes.

temperature and pulse begin to rise, then you know that in the uterus there is a pabulum upon which microbes can feed.

Or, a piece of membrane comes away with the lochia, although you had not suspected its retention in the uterus, and the temperature and pulse begin to rise. Again you know there is a pabulum in the uterus upon which microbes can feed.

Or, when you douche the uterus and pieces of membrane come away whilst you are douching, you know there has

been membrane retained in the uterus and probably some is still left.

Or, when in spite of your having removed the pabula supplied by lochia retained in the vagina or uterus, you find no improvement in the case, the strong probability is that there is a piece of retained afterbirth.

Or, when the afterbirth was delivered, although the placenta was broken and mushy, you thought it had probably all come away, yet the temperature and pulse begin to rise, the practical probability is that some was retained in the uterus.
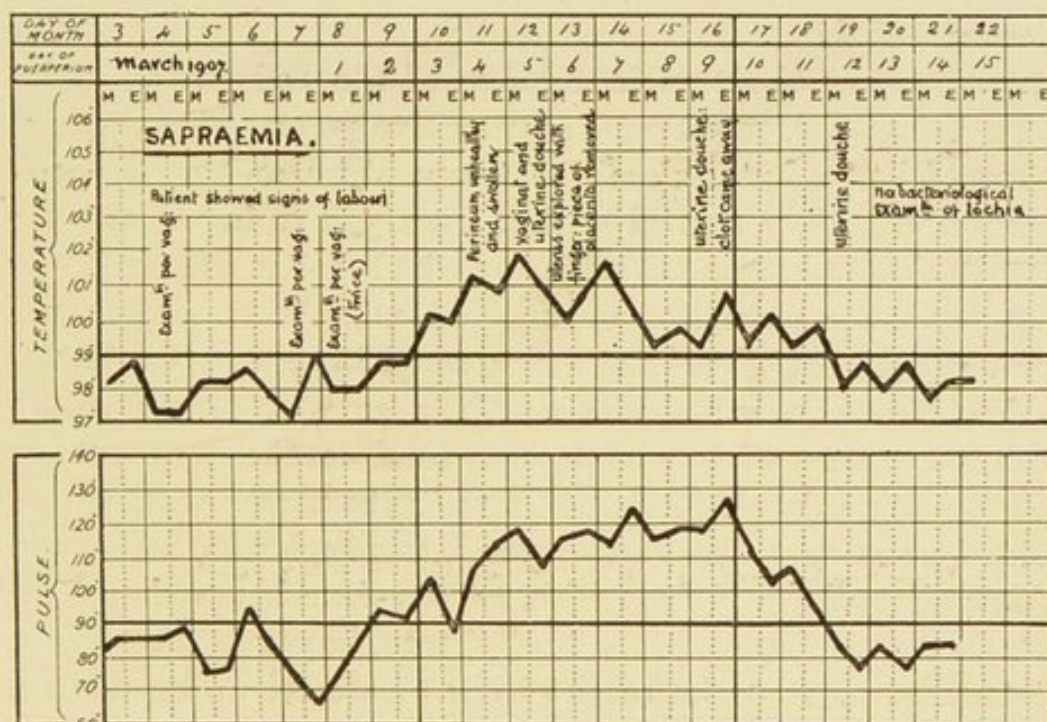
Fig. 158. Severe sapraemia.   Retained placenta.

In all these cases without exception the lochia will be abundant and either heavy or foetid.

Rarely, a smart haemorrhage will be the first indication that a piece of placenta has been retained.

Course and treatment. Sapraemia due to retention of a piece of afterbirth usually begins to give signs of its presence about the third or fourth day, the same days in fact on which the milk comes into the breast. The lochia becomes heavy or foetid, the pulse quickens, the temperature rises. The patient does not appear to be very ill, although she may have some headache and

loss of appetite. If you do not already suspect retention of some part of the afterbirth, you give her a purge and quinine, but the temperature and pulse, though they may fall, do not remain normal. Within some twelve hours you give her a vaginal douche and she is made no better. Within twelve or twenty-four hours, as the case may be, you should give an intra-uterine douche, and on moving the Bozemann's catheter about in the uterus, you may dislodge some pieces of membrane. You must put in a wick of gauze as a drain. The result of your intra-uterine douche may be that the temperature shoots up another two degrees. You have by your disturbance of the microbic area spread the infection over the wall of the uterus, or in other ways brought about an inoculation of the body with the infective material, resulting in a negative phase. The positive phase follows, but unless the temperature and pulse reach normal or nearly normal within twenty-four hours, and the lochia are no longer offensive, you had better not wait any longer, but explore the uterus. If, when the temperature first began to rise, you had strong suspicions or actual knowledge that you are dealing with a case of sapraemia, do not waste time with quinine or vaginal douches, but give an intra-uterine douche and lightly pack the uterus with gauze. This gauze sometimes entangles the membrane, and when you pull out the gauze within twenty-four hours the membrane comes with it. If this fails to improve the patient definitely, remove the retained bits of afterbirth by manual exploration of the uterus.

If you do not do so, there is constant fear that acute sepsis or invasion of the body with living organisms will supervene, with rigors, rapid pulse, high irregular temperature, severe headache, insomnia, and inflammation of the pelvic interstitial tissue or pelvic peritonitis. You must, in short, get rid of the microbes, and the pabulum on which they flourish, and which forms the base of their attack on the body, as quickly as possible.

Exploration of the uterus. First take the baby from the breast. An anaesthetic, preferably ether, will be needed, unless your patient is a brave woman. You can, indeed, be far more thorough when the patient is under an anaesthetic.

For the rest, the treatment is similar to the removal of retained bits of membrane or placenta causing post-partum haemorrhage. The patient is in the cross-bed position, the vulva cleansed, your hands washed, the bladder emptied, the vagina douched. Put your whole hand into the vagina and as much of your hand as you can into the uterus. Later in the puerperium, two fingers will suffice. There is no difficulty in passing the puerperal os. It is easier to explore without a glove, but you get the virulent germs on your hand and, however much you wash, you may infect other patients. Pull away as many bits of retained membrane or bits of placenta as you can, and then roll up a bit of gauze and wipe the uterine walls with it, steadying the uterus the while by your other hand on the abdomen. Go up again and again into the uterus, until you feel sure that there are no frag-. ments left. The placental site always feels rough, and has a few shreds of blood clot attached to it, which you can wipe away. Then douche the uterus thoroughly with hot creolin solution and lightly pack the cavity with gauze. The temperature may rise after the exploration. Pull out the gauze next day, and from this time onwards the lochia should become sweet and the patient restored to health. You may have to give a few more intra-uterine douches before recovery, but you will not have to again explore her uterus.

PUTRID ENDOMETRITIS

In some cases, when you explore the uterus, you find the whole interior of the uterus is shaggy, and what you scrape away is so generally distributed and shreddy that it is clear it is not only membrane. The case is one of putrid endometritis, with which is practically invariably associated infection by the bacillus coli. You douche and drain the uterus, but the abundant foetid lochia still continues. You do not again explore, but you will have to douche out the uterus night and morning with creolin solution, or, better, sterile salt solution.

The patient is likely to be very ill, so give her slop diet of a nourishing kind, make her sleep, give her stimulants and treat her as you treat other cases of exhausting infection.

THE USE OF THE CURETTE IN SAPRAEMIA

The curette is not nearly so efficient as manual exploration. The only advantage the curette has, is that an anaesthetic is not necessary, and its use will not re-open a tear of the perineum as the hand in the vagina does. In a mild case
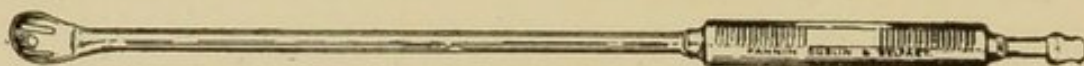
FIG. 159. Rheinstadter's flushing curette.

Rheinstadter's flushing spoon curette may be passed lightly over the uterine wall, in the hope of ensnaring bits of membrane. But we do not advise any greater reliance than this to be placed on curettage. In putrid endometritis, the curette has no place.

ACUTE PUERPERAL SEPSIS

Acute puerperal blood-poisoning, in other words, the invasion of the body from the uterus by septic microbes, leads to so many different clinical conditions that it is impossible to give an accurate description of a case. The patient may be attacked within thirty-six hours of child-birth and be dead within another twenty-four hours from overwhelming toxaemia. She may first suffer from sapraemia, and septic-aemia, due to living microbes in the blood, come to be super-added. Rigors occur and the general condition of the patient is far worse than is customary with sapraemia. Frequent rigors may occur at fairly definite intervals, and true pyaemia may supervene. Acute endometritis with outpouring of pus and a large tender flabby uterus is another form of acute puerperal sepsis. Acute inflammation of the pelvic cellular tissue (parametritis) or of the pelvic peritoneum (perimetritis) or the two together afford further clinical pictures. Acute pyosalpinx is another variety, but which is usually associated with perimetritis and parametritis. Lastly, acute general peritonitis may end the life of the patient.
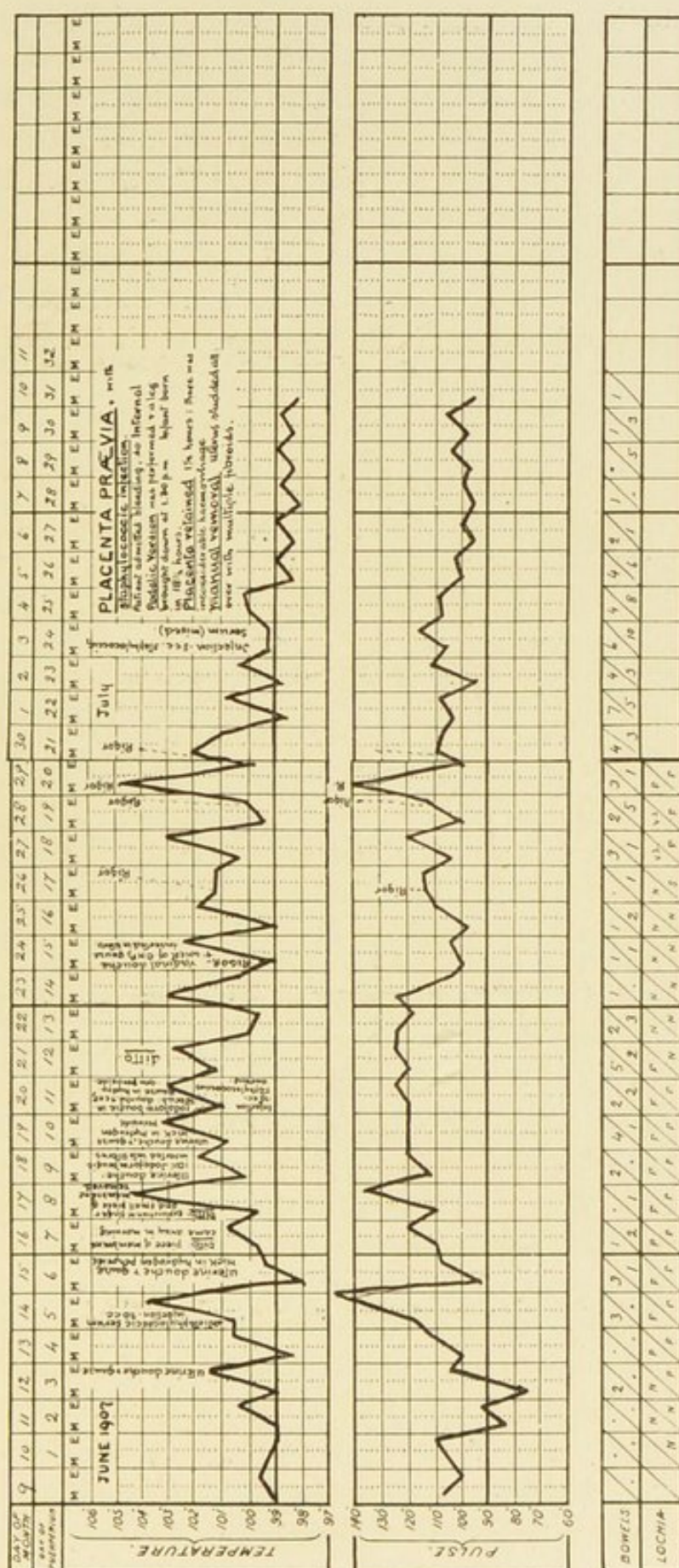
Fig. 160. Placenta praevia. Staphylococcic infection. Recovery.

An acute infection that presents such a variety of possibilities is difficult to describe concisely. We will describe first a typical case of acute lymphatic sepsis, then deal briefly with parametritis, perimetritis, pyosalpinx, and acute peritonitis; and then describe a typical case of pyaemia. But it must be remembered that several of these conditions may be associated, and any of them may be implanted on the lesser degrees of infection and sapraemia. Fortunately, in well-conducted midwifery, acute puerperal sepsis is rare.

ACUTE LYMPHATIC SEPSIS

Onset. Acute blood-poisoning, arising from punctured wounds, may develop within twenty-four hours. But when
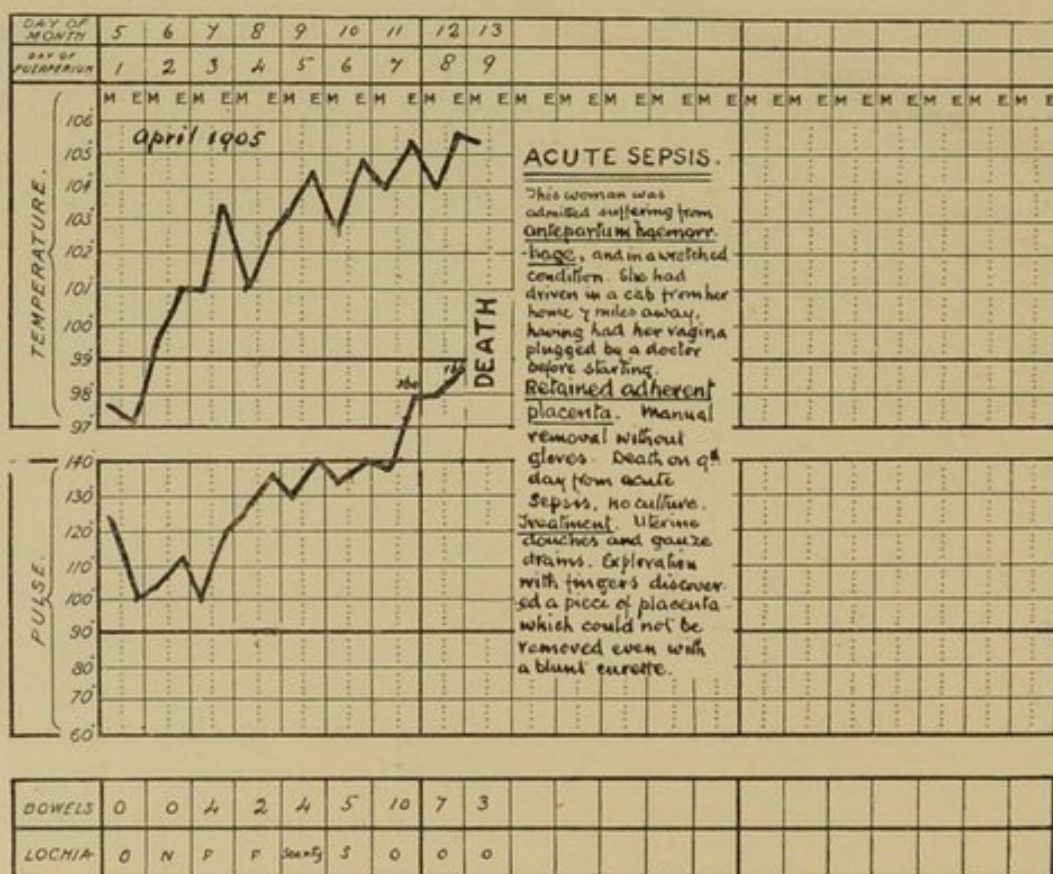
Fig. 161. Acute sepsis. Death.

the poisoning arises from infection of the parturient canal, there is nearly always an incubation period of thirty-six

hours or more. When acute sepsis arises in less than twenty-
four hours from the birth of the child, the infection probably
occurred before the birth of the child.

Symptoms and signs. These are not in any way different
from acute blood-poisoning in men or in non-puerperal
women.

The attack most frequently is ushered in by a rigor. The
temperature as a rule rises above normal, and it is character-
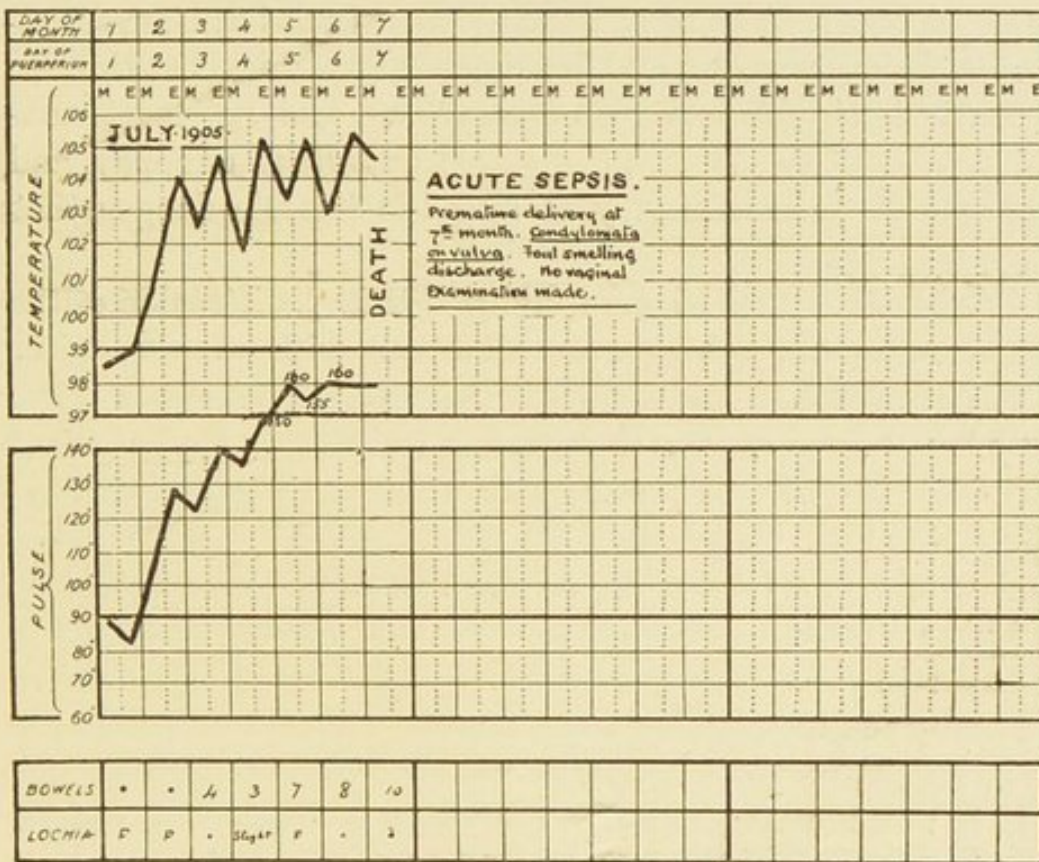
Fig. 162. Acute sepsis.

istic of the temperature of acute lymphatic sepsis when once
raised to remain above normal. In some cases, when the
infection is very violent, the temperature shows no response
and may actually be subnormal. With or without pyrexia,
the other symptoms of a toxic fever appear. The patient
has a severe headache, she is thirsty, she is hot and flushed.
The lochia are much diminished or absent and typically
are not foetid. The breasts are unchanged, except that the
flow of milk diminishes or ceases. The tongue, usually

at first furred and then dry and brown, yet may be moist and clean throughout the illness.

Hence, a case of acute sepsis may present a normal or insignificant temperature, no lochial changes of any note, no breast changes, and a clean, moist tongue—a group of symptoms which is very misleading. But if you are careful to feel and count the pulse, you will always be warned of the true condition of the patient. The pulse rises progressively and becomes feebler, until it is uncountable before the final issue of death. The next most reliable sign of acute lymphatic sepsis is the severe and intractable insomnia, and, thirdly, we attach significance to restlessness. The patient is conscious almost to the last, but she is querulous, unhappy, and apprehensive, instinctively fearing the terrible danger that threatens her.

Diarrhoea with passage of undigested food, distension of the abdomen and vomiting may all occur without peritonitis. Cutaneous rashes are common. The uterus involutes fairly and is not tender. On the third or fourth day, if the patient survives, the clinical picture may change. The patient says she feels much better, that she is weakened by lying in bed and would like to get up, or she thinks she would get well if only she could sleep better. But this change from apprehension to hopefulness, known as euphoria, is one dreaded much by the experienced obstetrician. He does not share the delusion of his patient, and knows that when a patient says she is much better and yet her pulse is faster and feebler, she is sure to die. He sees also how her pinched and sallow face, her pale, tremulous lips, and the fine tremor of her hands belie her hopeful words. In a few hours or a day or two, she sinks into unconsciousness and dies.

Prognosis. It is not possible to say how fatal acute lymphatic sepsis is, from statistics, for statistics depend on what the individual considers as acute lymphatic sepsis. For our part we look upon the true disease as almost invariably fatal. A case in which the patient vomits, has diarrhoea, frequent rigors, and insomnia, is very hopeless. The condition of the pulse is the best test of the state of the patient.

Autopsy. The condition of the body after death is the

same as that following other acute toxaemias. There may be a little local peritonitis or some pus in the tubes. The interior of the uterus is smooth, its wall is firm. To the unaided eye it may look unaffected. But when a section is cut of the uterine wall and endometrium, and examined with the microscope, the true condition of the disease is seen. The lymphatics of the uterine wall are invaded by microbes, and the leucocytic infiltration that should oppose them is either absent or meagre. The victory is clearly with the microbes, which have not stopped to feed on some remnant of afterbirth, but have rapidly invaded the living tissue of the uterus, and may be found elsewhere living in the blood and lymph streams.

The streptococcus is practically always the offending organism, though often associated with other organisms.

Treatment. In a disease of such a hopeless character, treatment is not of much avail.

The onset is so marked with rigor and definite severe illness, that you are not seduced into thinking constipation or some trifling condition is the cause of it. First take the baby from the breast. Raise the head of the bed; the bowels fall down, and help to limit peritonitis, if it arises. As soon as possible take a culture from the uterus and explore it with your hand in the hope of finding some remnants of afterbirth, and, if so, a wrong diagnosis. If you find nothing but smooth uterine wall, further local uterine treatment is not only of no avail, but is probably harmful. Therefore do not give any uterine douches.

In the general consideration of sepsis we pointed out that scanty lochia meant that the lymph and blood were not reaching the infected part in the same amount as in inflammations in which the body processes overcome the microbic invasion. Our treatment, then, is to attract blood to the part. This we do by giving hot, low vaginal douches night and morning and citric acid ($\text{3ss } 4^{\text{tis}}$ horis), and are glad if we see a more abundant lochia as the result of this treatment.

We also rub in 3j of Credé's ointment (collargol gr. xvij to lard 3j) to increase the number of leucocytes.

Prior's operation of opening Douglas's pouch through the

posterior fornix, letting out the stagnant lymph collected there, and stuffing the pouch with iodoform gauze, seems to us rational, and Prior has had good results from it.

Anti-streptococcic serum (10 or 20 cc.) may be injected into the loin every twenty-four hours. We neither recommend nor condemn this treatment. The cases in which we have tried it have not been made any better, in fact in two cases the patient seemed to be worse after the injection.

Neither do we think that infusion of saline solution under the breasts does any good. If the patient is thirsty encourage her to drink freely. In the last stages, when she is vomiting and has diarrhoea, no treatment is of any avail.

The rest of the treatment is similar to that of other acute fevers, namely, liquid diet, and the general treatment that comes under maintaining the patient's strength, and attending to the bowels. Abundant fresh air is valuable.

We do not think morphia a very good hypnotic, for the sleep given is not restful.

Cold sponging or a cold pack or cold bandages to the head reduce the fever, and often make the patient sleep.

In our experience alcohol in either small or heroic doses has little effect on the issue.

PUERPERAL PELVIC INFLAMMATION

Parametritis, perimetritis, and salpingo-oophoritis. Parametritis is inflammation of the pelvic interstitial tissue, perimetritis of the pelvic peritoneum. Salpingo-oophoritis, inflammation of the ovary and tube, in most cases occurs in association with them. From the obstetricians point of view they may be grouped together as Puerperal Pelvic Inflammation. The differential diagnosis and differential treatment belong to gynaecology, and are fully described in gynaecological works.

Paths of infection and pathology. The endometrium of the uterus may first become affected, as in sapraemia or in pyaemia. A reactionary endometritis occurs. The endometrium pours out pus or foul discharge. The uterus is

large, soft, tender, and does not involute. The inflammation spreads to the tubes, and the abdominal openings of the tubes are closed by local peritonitis. Pyosalpinx results. Sometimes the abdominal openings of the tubes are not closed and the microbes cause a perimetritis. Parametritis and perimetritis may occur apart from pyosalpinx, the infection spreading directly through the uterine wall.

Signs and symptoms. The patient for the first few days of the puerperium is fairly well, but the temperature, pulse, and general signs disclose some slight puerperal infection. The temperature or pulse are a little raised, the lochia is not sweet, and the uterus does not diminish in size as quickly as usual. With regard to this latter point of involution, it must be said that in quite normal cases one sometimes finds that the uterus does not apparently alter in size for three or four days together. Again, the signs of puerperal infection may be more severe, the temperature and pulse definitely raised, the lochia foetid, and the uterus large, soft, and tender.

Then, at the end of the first week or later, a rigor occurs, the temperature rises to 103° or 104°, the pulse rises, and the characteristic symptom of severe pelvic infection comes into being, namely, severe abdominal pain. It is this severe pain, comparable to the acute pain of appendicitis, that enables you to diagnose acute pelvic inflammation. Accompanying it you find tenderness when you press over the hypogastrium, and rigidity of the muscles. The patient is ill, with signs similar to the better known acute appendicitis, namely, she is hot, feverish, has headache, sickness, and probably the bowels are confined. In just the same way the inflammation after a few days may subside; a large serous effusion may form; or abscesses may result; and more rarely general peritonitis ensues; adhesive inflammation may follow, and the disease may become chronic. The differential diagnosis of these conditions and their sequelae belong to gynaecology.

Treatment. Take the baby from the breast.

Raise the head of the bed, so that the intestines fall down into the pelvis, and by their adhesions limit the spread of the inflammation.

Explore the uterus once gently at the onset and make sure that there are no remnants of afterbirth.

No further local treatment of the uterus is indicated.

Hot, low vaginal douches once or twice a day relieve pain, but in a reactionary inflammation, in which leucocytosis is well marked, neither collargol nor citric acid are indicated.

Hot stupes to the hypogastrium also relieve pain, and a pillow or bolster under the knees relaxes the muscles and makes the patient more comfortable.

Except at the outset, when pain is very severe, we do not give morphia.

For the rest, the general treatment is similar to that you would adopt in other cases of acute abdominal inflammation, such as appendicitis. When you diagnose an abscess, you must open it and drain it, either through the vagina or abdominal wall, as the case may be. When general peritonitis occurs you can open the peritoneal cavity and drain, but we now regard this as hopeless in puerperal peritonitis. Otherwise, as in appendicitis, treat expectantly, but be prepared for relapses and later for the pain of adhesions.

ACUTE GENERAL PUERPERAL PERITONITIS

This does not differ from other kinds of acute general peritonitis either in signs, symptoms, or treatment. The only treatment for this almost hopeless condition is free drainage through the abdomen and Douglas's pouch. We ourselves do not operate in these cases, and we know of no case in which operation has saved the patient.

PYAEMIA, OR ACUTE VENOUS SEPSIS

Pyaemia is a more common puerperal infection than acute lymphatic sepsis. The germs that cause acute venous sepsis are the same as those that cause acute lymphatic sepsis, though staphylococci are said to occur rather more frequently in the former than in the latter form of infection.

The name pyaemia is not so good as acute venous sepsis,

for though distal abscesses usually form, they do not invariably do so, and the name acute venous sepsis contrasts better with acute lymphatic sepsis.

Path of infection. Pyaemia arises most frequently from the placental site. Here are venous sinuses in abundance. During the removal of a retained or adherent placenta local infection may occur, or a piece of placenta, being left behind, gives a chance for microbes to develop. The venous sinuses are occluded by blood clots. The microbes become implanted on the blood clots and loosen them by peptonization. This peptonization has to occur before the characteristic symptoms set in. The onset is for this reason late. Acute venous sepsis begins as a rule about a week after the birth of the child, but it may not occur until three weeks after birth. In the latter event, the onset of pyaemia may not occur until after the doctor or nurse has terminated attendance, and mistakes arise in this way.

Signs and symptoms. Probably in all cases the onset of pyaemia is preceded by signs of puerperal infection.

The actual onset is sudden. Either before or after the patient has got up from her bed, she feels a sudden chill, her teeth begin to chatter, her lips are blue, and her face is drawn and pinched. Both her temperature and pulse rise, the former reaching quickly up to 104° or 105°. Then follows a profuse perspiration, and the temperature and pulse again fall to normal, and the patient feels quite well. When you call, the symptoms may have passed off. Your patient tells you she has caught cold, but that she went to bed, got into a perspiration, and now feels well. You take her temperature and find it normal. You feel her pulse; it is slow. There seems to be no cause for alarm and you may be misled. But a few hours later, or the next day, another rigor followed by perspiration gives the true significance of the first. The patient has not caught cold, but she is at the beginning of a severe and frequently fatal illness, namely pyaemia. You attend to the condition of the lochia, and you find that they are foetid, or that in the later weeks reddish lochia is still present.

There is, then, a notable difference between the pulse and
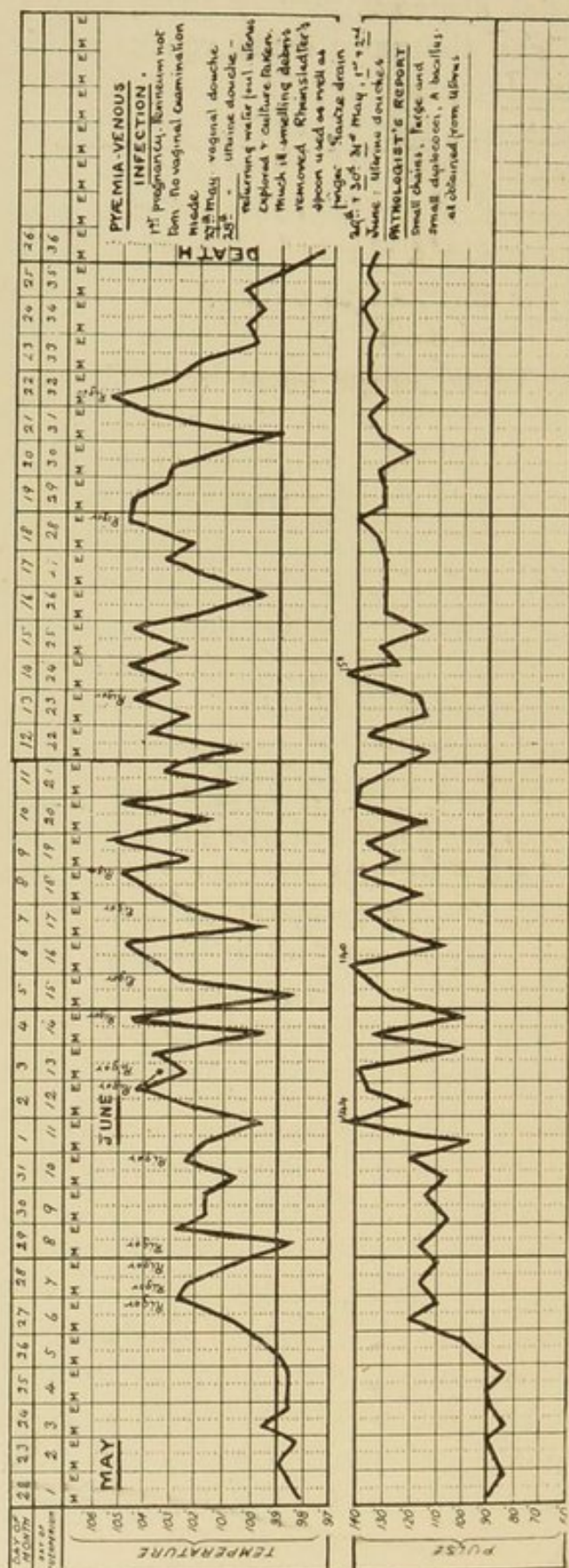
Fig. 163. Pyaemia. Venous infection. Death.

temperature in this disease, and in acute lymphatic sepsis. In the latter, when once the temperature has risen above normal, it remains above normal, and when once the pulse has quickened, it continues to become quicker and quicker until death. In pyaemia the pulse does not indicate by its rapidity the presence of a dangerous infection. The pyaemic infection is not a continued infection like acute lymphatic sepsis. The microbes, and their toxins, are not continually dribbling into the system on the slow lymph stream. Rather it is a spasmodic infection, and the invasion of the system by microbes is sudden and temporary. It has long been taught that this spasmodic character of pyaemia, with its sudden rigors, is due to the dislodgement of septic thrombi from the veins into the blood stream. It seems highly probable that this is so, for after a rigor a new train of signs often arises. The patient may become paralysed or speechless; she may develop meningitis; she may get a violent stitch in the side, which is followed by pleuritic effusion and empyema; she may get septic pneumonia; she may get severe pain in a joint, followed by purulent arthritis; she may get malignant endocarditis; she may get subcutaneous abscesses (these, it may be added, are of favourable import); in short, there is hardly an organ in the body in which one of these floating septic rafts may not lodge.

As the disease progresses, the intervals between the rigors become shorter, or the incidence of complications causes a continuous intoxication, and both temperature and pulse are permanently raised. The patient becomes weaker, and dies as in acute lymphatic sepsis.

In other cases pyaemia takes on a more chronic form. Abscess after abscess forms, and is opened. The patient is weak, and her face sallow, but after a prolonged and trying illness, she finally recovers, though frequently crippled by stiff joints and permanent invalidism from pelvic disease.

Prognosis. Although pyaemia is a chronic disease, yet its final issue is frequently fatal. It is never safe to give a good prognosis. Such sudden complications arise. Suppurative meningitis, septic pneumonia, malignant endocarditis, occur suddenly, as it were, by chance, and without warning.

Treatment. Take the baby from the breast.

At the onset, explore the uterus once gently, and remove any remains of afterbirth. Douche the uterus gently daily as long as the lochia is foul. Do not use the curette, for fear of dislodging septic thrombi.

Hot, low vaginal douches are scarcely likely to do good, and neither collargol nor citric acid are indicated. Whenever an abscess forms, and you can open it, do so on ordinary surgical principles.

Treatment that 'keeps the strength up' is of course needed. Abundant fresh air, such as getting the patient to live and sleep out in a sheltered balcony, is invaluable. Practitioners in the past, who saw a great deal of sepsis, placed much reliance on Tincture Ferri Perchloridi in doses of thirty to forty minims three times a day. We give it, unless it causes indigestion.

The bowels are kept regular, and sleep induced by hypnol, veronal, or some combination of harmless hypnotics. Some have opened the abdomen and ligatured the pelvic veins above the thrombus in cases of chronic pyaemia, they believe this has done good.

PHLEGMASIA ALBA DOLENS

Venous form. Sometimes the venous thrombosis spreads locally in the veins of the broad ligament, and reaches the femoral vein or other veins, resulting in what is known as white leg.

Lymphatic form. A rarer form of white leg follows the coagulation of the lymph in the lymphatics of the pelvic cellular tissue, spreading down into the thigh.

Onset. Owing to the slow spread, the onset is delayed and may not occur until four to five weeks after the birth of the child.

Signs and symptoms. Most cases of white leg are septic but some few are not septic.

The non-septic cases occur when the circulation is feeble, or the veins varicose. There is no raised temperature or

pulse in these cases, but in other respects they are similar to septic cases.

The septic cases usually have had some signs of puerperal infection. They set in with violent acute pain in the leg, and tenderness, accompanied by fever. If the patient is up, she notices that her leg is heavy, and she feels as if she is walking on wool. When you see her, her leg is tender, red and swollen, but does not pit on pressure. You can feel the hard, tender cord of the thrombotic femoral or internal saphenous veins. In a day or two these characters change; the leg becomes white, and pits on pressure.

The leg is a little different in the purely cellulitic or lymphatic form. The swelling is hard, and never pits on pressure. It begins in the thigh, whereas in the venous form it begins in the leg. Rarely, too, the skin may show patches of gangrene at a later stage. The two conditions are not infrequently mixed. The left leg is most commonly affected. Swelling of the one leg may be followed in a week or two by swelling of the other.

Prognosis. White leg is a local disease, and does not kill of itself. Its great danger is pulmonary embolism. We have seen a patient, who had been in bed five weeks, die in a few minutes from a pulmonary embolus, dislodged by the effort of raising herself on a bed-pan.

Treatment. The main purpose of treatment is to avoid all risk of pulmonary embolus.

Take the baby from the breast.

Rest the affected leg on two pillows with the knee a little flexed, and keep the leg still by laying sand-bags on either side. The leg must be kept warm to avoid gangrene. The best way to do this is to wrap it round with wool. If there is much pain, use lint soaked in lead and opium lotion equal parts, or soaked in glycerine and belladonna, or ichthyol one part and glycerine nine parts. Put a cradle over the leg to keep the weight of the clothes from it. Never massage the limb, and palpate it very lightly, when feeling for the swollen veins.

Give her medicine so that the bowels are opened daily, for straining at stool may result in pulmonary embolism. The

nurse must lift the patient on to the bed-pan. She must not help herself.

If the thrombus suppurates and forms an abscess, open it. Provided pyaemia does not ensue, the case will then get well. Give her good food, and allow abundant fresh air.

She must stay in bed for at least six weeks after the pulse and temperature have returned to normal.

When the patient is allowed to get up she finds her leg is not as strong as the unaffected leg, and it may remain weaker for years. It feels heavy, tends to swell and ache, gets cold, and the toes are subject to chilblains in winter.

To prevent this as far as possible, tell the patient to keep the leg warm by an extra stocking. Bandage the leg firmly and evenly with a crêpe bandage from the foot up to the middle of the thigh, or get her to wear elastic stockings. Tell the patient to take plenty of exercise, but not to stand. We find that bicycling is efficacious in promoting a better circulation in the later stages. When she rests, it should be on a sofa with the leg raised.

INFLAMMATION OF THE BREASTS

Mastitis is divided into (1) parenchymatous, and (2) interstitial. The distinction is important, for the course and treatment of the two inflammations are different.

Cause. A cause is frequently found in cracked nipple. This is not invariably the cause, although practically it is very unusual to find mastitis in a breast whose nipple is completely free of abrasions.

Treatment of cracked nipple. The curing of a cracked nipple prevents the onset of mastitis. The best way of curing it is to produce a false skin on the surface of the fissure. To do this first paint the surface with cocaine (4 per cent.) to deaden pain, and then with either silver nitrate solution (gr. x to ℥j), friar's balsam, or glycerine and tannic acid (B.P.) twice a day. Wash the nipple free of these chemicals before the baby takes it. If suckling causes much pain, advise a nipple shield until the crack is well.

Management of a nipple shield. The proper management

of a nipple shield involves a few minor points. If the baby refuses to suck the shield's nipple, squeeze a little breast milk into the shield, and wet the surface of the nipple with the
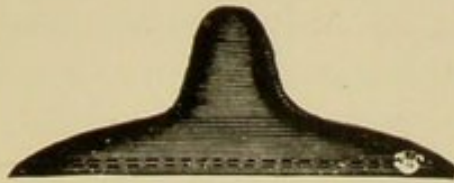
FIG. 164. Nipple shield.

milk. This will induce the baby to suck. We scrub the shield before and after use with soap and water, keep it in a solution of washing-soda, and boil it once a day.

Parenchymatous mastitis. In parenchymatous mastitis, the inflammation is limited by the epithelium of the milk ducts.

Signs and symptoms. It is difficult to draw the line between the tense, knotted, heavy breasts, which are over-full, and slight parenchymatous mastitis. The patient complains that her breasts feel full and are painful. On examination you find the breast is hot, and perhaps a little tender, and that a wedge-shaped area of breast tissue, with apex pointing to the nipple, is harder and more tender than the rest of the knotty breast. The skin is flushed pink over this wedge area. The patient's temperature may be a little raised, and she may feel unwell, but constitutional symptoms are slight.

Treatment. The baby need not be taken from the breast. The sucking actually relieves the engorgement of the breast. As many authors recommend the taking of the baby from the breast, it may be interesting to note two facts in support of the Rotunda treatment. The first is case No. 483 in Dr. Smellie's book. In this patient Smellie found the breasts 'grew excessive hard and inflamed'. A stronger child than the mother's infant was put to the breasts, with the result that the breasts were restored, and the feebler infant again suckled. The second fact is indirectly favourable to our treatment. In Australia, cows used to die of milk fever. The cause of the fever was found to be inspissated milk blocking

the milk ducts. Pumps are now used to free the ducts, and there is no longer milk fever.

We apply cold boracic stupes to the breast, cover this with wool, and firmly bandage the breast over the wool, leaving an opening for the nipple, to permit of suckling. We do not apply poultices of any sort to either parenchymatous or interstitial mastitis. A purge is also given. With this treatment nearly all cases get well. Sometimes the microbes penetrate the ducts, and an interstitial mastitis is superimposed.

Interstitial mastitis.

Symptoms. This is a more serious affection than parenchymatous mastitis, by which it may or may not be preceded. The pain is greater, the colour of the skin over the affected area is dusky, there is oedema and pitting on pressure, and suppuration is almost invariable. The affected area is not wedge-shaped, but is irregularly disposed in any part of the breast. Constitutional symptoms are marked, the temperature may be up to 104°, the patient feels ill, has headache, anorexia, flushes of heat, and may even have rigors.

Treatment. Take the baby from the breast.

Before the advent of pus, the case is treated similarly to a case of parenchymatous mastitis, namely, by purging, cold boracic stupes, and bandaging.

When pus has been diagnosed, or when a woman comes to you with a sinus already formed, we advise the following operation for freely draining the abscess :—

Wash the skin of the breast.

Give the patient gas or ether, but not chloroform.

Make an incision about an inch long over the lowest, not the reddest, part of the inflamed area. Push a gloved finger into the inflamed tissue through this incision, and break down the affected breast tissue. Healthy breast tissue will resist the tearing action of your finger, unless you use great force. The diseased tissue will readily break down, and you can fearlessly continue as long as it does so. When you have broken down this tissue, explore with your finger and form a mental picture of the cavity and pockets that have resulted from your manipulation. Pass in a large Bozemann's catheter

attached to a douche can, and flush out each separate recess
and pocket with creolin solution (℥j to Oj).   Take several
long strips of iodoform gauze, soaked in 2 per cent. carbolic
acid lotion.   Ram this gauze strip by strip into each separate
recess or pocket with sinus forceps and a long probe.   At the
end of the operation every part of the abscess cavity has its
whole surface in contact with the gauze.   If this is not so,
but a pocket is left, this pocket forms the starting-place of a
fresh inflammation of the breast.   Cover the breast with
aseptic wool and bandage it tightly, so that, perhaps, slight
inconvenience in breathing is noticed by the patient.   On the
next day the plugs are withdrawn and some pus runs out.
Again douche out the cavity and re-plug, but without an
anaesthetic.   Repeat on the third, fourth, and fifth days.   By
the fourth or fifth day, only a little watery fluid escapes on
the withdrawal of the plugs.   Further drainage is now need-
less.   We do not even insert a wick of gauze between the
lips of the wound.   Cover the breast with wool, and again
bandage firmly for two days.   The clean granulations adhere
to one another, and the abscess cavity is obliterated.   Only
in the event of some pocket escaping the action of the gauze
and carbolic will another abscess arise.

CHORION-EPITHELIOMA

Chorion-epithelioma is an exceedingly rare malignant
puerperal disease of the uterus.   It follows hydatidiform
mole, abortion, and more exceptionally a full term labour.

Signs and symptoms.   Irregular, recurrent, smart haemor-
rhages first give evidence of its presence, and it is by these signs
you must recognize it, if you wish to do any good   A typical
history will be the following: the patient has an abortion, which
is complete.   During the puerperium she has a smart haemor-
rhage, and you, knowing that the probable cause is a retained
piece of afterbirth, explore her uterus.   You find some shaggy
stuff, which you clear away, and having emptied the uterus,
you are satisfied your patient will now be all right.   At first
all seems well, but later you are surprised to find she again
has irregular haemorrhage, and on exploring her uterus for

the cause, you find its interior is again shaggy. You then pull away as much as you can, either with your finger or the blunt curette, and send them in saline solution to a competent pathologist for his opinion.

In the later stages the patient becomes cachectic and has a foul uterine discharge.

Treatment. There is only one treatment, namely, immediate panhysterectomy of the widest description possible.

PART V

THE INSANITIES OF THE REPRODUCTIVE PERIOD

CHAPTER XVII

INSANITIES OF THE REPRODUCTIVE PERIOD

Causes. Reproduction is the test of a woman, and should she be in any way mentally or physically weak, she is apt to give way under the trial. Subsidiary causes are (1) drink; (2) the toxaemia of pregnancy; (3) mania is not infrequent after eclampsia; (4) acute pain (a woman may become a raving lunatic, when the child's head is on the perineum); (5) sepsis is frequently a determining cause; (6) severe haemorrhage; (7) prolonged lactation is a severe strain to an unstable woman; (8) it is more common in unmarried women.

Kinds of insanity and percentages

The insanity of pregnancy includes about 10 per cent. of the cases. The type is commonly melancholic.

The insanity of labour forms under 10 per cent. The type is acute mania.

The insanity of the first six weeks after delivery forms some 60 per cent. The type is commonly maniacal.

The insanity of the lactating period forms some 30 per cent. The type is commonly melancholic.

Symptoms

Insanity of pregnancy. In pregnancy some change of character is common. Only when it passes into definite delusion does insanity become established. The onset of the insanity of pregnancy is recognized by an exaggeration of

this change of character. From the fourth or fifth month to any time later in pregnancy the patient becomes moody, irritable, or apathetic. Insomnia in the reproductive period is always of serious import; when severe it so often means the onset of insanity. The patient begins to sleep badly. Then she becomes definitely insane. She has delusions. If she vomits, she thinks she is being poisoned. She usually becomes melancholic. She sighs and groans, and nothing can shake her from her misery. She is usually constipated. She may be suicidal. She may get well before the birth of the child or not until after its birth. In rare cases she does not get well at all. This form of insanity is frequently due to the toxaemia of pregnancy.

Insanity of labour. Frenzy seizes the patient, as the head passes the vagina and vulva, in which she may kill the child. The attack usually passes off rapidly.

Insanity of the puerperium. This is nearly always associated with either severe anaemia from haemorrhage or with sepsis. The patient is first irritable and uneasy about unknown dangers. She has a headache. She may refuse food. Her bowels are confined. Above all, she sleeps badly. She dislikes to see either her child or her husband. She finally becomes definitely maniacal. She may have suicidal impulses. About 80 per cent. get well.

Insanity of lactation. The patient is not in full health. She is probably a multipara, who has had frequent pregnancies and exhausting lactations. She becomes gloomy, she sleeps badly, and her bowels are confined. She becomes definitely melancholic with delusions, and may try to commit suicide. The outlook is a little less good than that of puerperal insanity.

Prognosis. Taking all forms, the prognosis is good, for some 80 per cent. of all cases recover. If the patient gets fatter and her mind improves with her stronger physical condition, prognosis is good. If her mind does not improve with her bodily condition, prognosis is bad.

Treatment. Carefully examine the patient for any disease or other exciting cause, and treat such disease to relieve her of the additional strain. Take the baby from her in the last

three kinds of insanity. If puerperal infection is present, treat it. Three things are necessary to enable a patient to stave off or recover from an attack of insanity :—

1. Plenty of sleep.
2. Plenty of food.
3. Avoidance of constipation.

Whenever, then, a woman during the reproductive period suffers from sleeplessness, shows change of character and capricious appetite, or is constipated, overcome these defects, bearing in mind that, if you do so, any tendency to insanity is greatly decreased.

When the attack is established.

1. To give the patient plenty of sleep.

To induce sleep we rely chiefly on large doses of potassium bromide. Give potassum bromide ʒ ss. with chloral hydrate gr. xx, every two hours until the patient gets sleepy. Many other hypnotics are commended, such as paraldehyde, chloralamide, hypnol, &c., separately or in combination.

Morphia sometimes acts well, but often fails. If the patient is acutely maniacal, hyoscine (gr. $\frac{1}{100}$) given subcutaneously sometimes acts like a charm, the patient at once falling into a deep sleep with noisy breathing.

A wet pack is often most effective in inducing sleep. If the patient is an alcoholic, an enema of ʒ ij to ʒ iij of whisky, following chloral and potassium bromide, may turn the balance in favour of sleep.

2. To give the patient plenty of food.

Although a patient with acute mania has a quick pulse and a dirty tongue, it is astonishing how much she will eat. Her incessant restlessness needs a large supply of food. Whether she be melancholic or maniacal, as long as she will eat, let her eat as much as she can. If she refuses food, only firmness will conquer her. Take the food and order her to eat it at once. If you cannot impel her to do so by your ascendancy over her, do not go away and leave her the victory. Pass the nasal tube, or stomach tube at once. She will give in after this, for the procedure is disagreeable and she is cowed by being made to do what she did not want. If left to herself, she may starve herself to death. As regards

the amount of food, you can give her in one day as much as would suffice her for two or three days of ordinary health. You can pour much semi-fluid food down a nasal tube, such as eggs, milk, cream, cod-liver oil and pounded meat.

3. To keep the bowels open.

Use whatever purges you think best. If the bowels are very confined and the patient noisy, a drop or two of croton oil often makes her quieter. Mix it well with salad oil (ℨj), and give it to her to swallow, or pour it down the stomach tube.

4. General treatment.

Much depends on the capabilities of the attendants, and those accustomed to the charge of insane patients are to be preferred. One must always be with her to guard against any suicidal tendency, and to be ready for any outbreak of violence.

Leave as little as possible to relations, especially fussy and reproving female relatives.

The attendant sponges her night and morning with warm water.

Do not let her be strapped down. Strapping her down will madden her above all things, for she will think she is being tortured or murdered. If she struggles, the attendant should catch and direct, rather than oppose the movement. Put mattresses up against the adjacent wall, for her to kick against, if she is in bed.

If it is possible to get her up, do so, and make her walk about the room, or still better, in the garden. She will get tired and sleep better.

We treat these cases at home for a month, if the family can afford the expense, and if there is no improvement at the end of the month, send them to an asylum. By that time the friends are exhausted, and not so repelled by the idea of an asylum as at first; nor is it necessary for you to give a gloomy prognosis, for patients frequently recover with asylum treatment. One last word of warning; pay special attention to the bladder function, for mental cases frequently suffer from over-distension of the bladder.

PART VI

THE BABY

CHAPTER XVIII

ASPHYXIA NEONATORUM

THERE are two forms of asphyxia in babies when they have just been born. They are distinguished by the colour of the baby's face. In one the baby's face is congested and purple, in the other the baby's face is dead white.

Blue asphyxia. In this form the baby's face is purple, as if suffocated, and its body is firm and even rigid. The cord pulsates strongly. The reflexes are present. There are, of course, intermediate forms between this and 'white' asphyxia, in which the baby's face is neither purple nor white, and in which the pulsations of the cord are feeble.

Treatment. On no account encourage the baby to breathe before you have cleared its throat of mucus. Its first breath will be inspiratory, and if it sucks mucus into its lungs, it will pass into the more severe condition of asphyxia pallida. Neither should you cut the cord when it is beating strongly, for the baby is getting its oxygen through the placenta.

First suck the mucus out of the child's throat with a catheter. We use Carton's catheter. Pass it over the back of the tongue and suck. Withdraw the catheter and blow out the mucus into a rag. Again insert the catheter, suck, withdraw, and blow the mucus out. Continue to do this until you cannot suck out any more mucus. If you have no catheter, hold the child up by its ankles and hook the mucus out of the throat with strips of linen wrapped round your little finger.

Having cleared the throat, make the child breathe. Its reflexes are present, and smacking it, or throwing a little cold water over it, will make it cry. Tie the cord, when the pulsations have ceased, and give the baby to the nurse.

In the intermediate cases, quickly clear the throat, cut and tie the cord, and treat as asphyxia pallida.

White asphyxia. In this asphyxia, the child when born is of a deathly pallor, the limbs and body are flaccid and flabby, no reflexes are present, and either a very feeble, slow pulsation or no pulsation of the cord exists.

Treatment. Take off your gloves. Tie one ligature only round the cord for speed. Cut the cord. Hold the baby upside down by the ankles and suck or wipe the mucus out of the throat. Put the baby in a hot bath, as hot as is comfortably borne by the hand. Hold the baby's head out of the bath with one hand, and splash the hot water over it with the other. Push the fingers of the other hand up under the ribs until they touch the heart. If the heart has stopped beating the child is dead. But be sure it has completely stopped before you abandon treatment. If the heart has not ceased, again suck any mucus out of the throat with the catheter. Dry the child quickly on a towel the nurse has warmed by the fire, and do Schultze's artificial respiration four to six times. Again put the child in the hot bath, suck any mucus out of the throat, and feel for the heart. If there are any signs that the baby is coming round rub a little whisky on its gums with your little finger and rub some whisky on its body. Again dry the child on a warm cloth and repeat Schultze's artificial respiration. If the child's skin gets pink, try the effect of a little cold water thrown over it. If it gasps, you can continue Schultze, hot bath and a sprinkling of cold water, until it cries. If it does not gasp, continue the hot bath, drying, and Schultze, as long as the heart beats or until the child cries. Watch it carefully by the fire after it has cried, for fear it should relapse.

How to do Schultze's artificial respiration. We think, when properly done, this is much the most effective mode of artificial respiration. The Sylvester method, done in the same way as to a man who has nearly been drowned, is not used

at the Rotunda Hospital. If you are uncertain of Schultze's method practise it on a dummy or a stillborn baby.

The figures explain the way of holding the child. Your index fingers and thumbs encircle the baby's axillae, your little fingers press against the baby's occiput and steady its head, which also rests between the ulnar surfaces of your hands. Your middle and third fingers pass down the child's
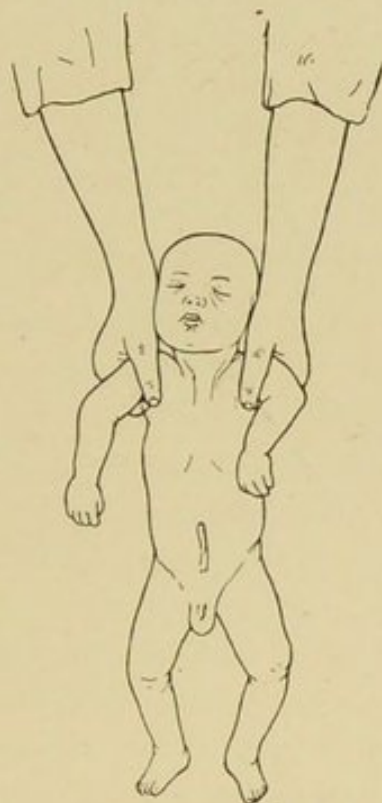
FIG. 165. Schultze's artificial respiration. Inspiratory position.

back. You stand with your legs apart, and the baby's body hangs between your legs. This is the inspiratory position. Swing the baby a little gently to and fro for a second or two to see that you have a firm grasp, and that the baby will not slide from your hands. Then swing the child boldly forwards away from you, so that it sweeps upwards, until it is about the level of your head. Then in the same movement draw in your extended arms and the child's lower limbs fall over on to its chest with its head turned downwards near to your face. This is the expiratory position. The lower limbs falling over flex the child's abdomen, which in turn presses the abdominal viscera up against the diaphragm and makes it ascend into

the chest. This ascension of the diaphragm into the chest
is the action of expiration; it squeezes the air and mucus
out of the chest. At the same time you help by squeezing
the child's ribs, doing this without in any way altering the
position of your hands and fingers. Do not keep the baby
long in this position, for fear it should, in this expiratory
position, attempt to inspire. The necessary pause to prevent
hurrying should be made when the baby is in the inspira-
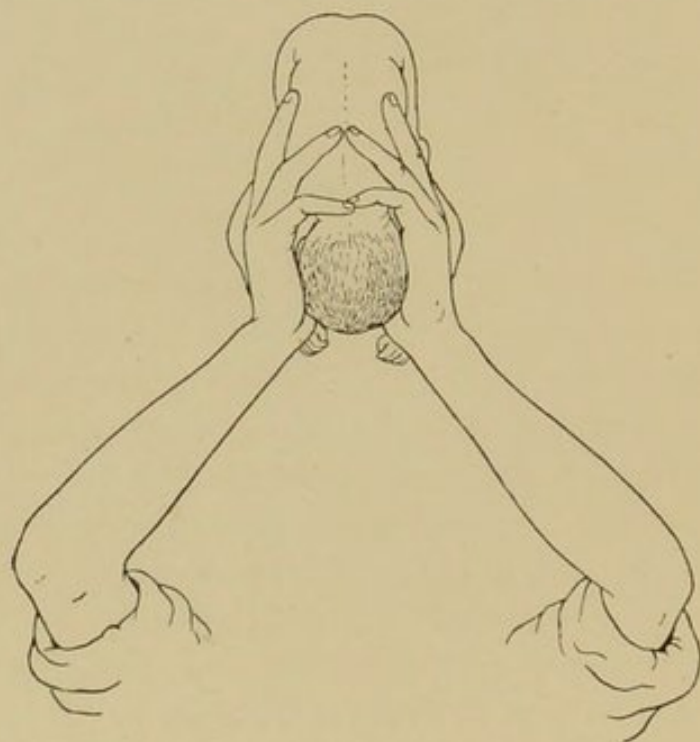
Fig. 166. Schultze's artificial respiration. Expiratory position.

tory position. To swing the baby into the inspiratory posi-
tion, fling the child outwards and a little upwards by extending
your arms. We do not mean to convey violence by the word
fling, but the secret of the correct Schultze's method is to make
the baby swing by its own weight from one position to the
other. A gentle push forward of your arms makes the child
flop back with a jerk which may damage or even break its
spinal column. You should perform Schultze's movements at
the rate of eighteen to twenty per minute.

CHAPTER XIX

THE HEALTHY BABY

General Directions for Management—Breast Feeding: its management—Spoon and Bottle Feeding—Milk Mixtures—Sterilization—Several Conditions of a Baby's Welfare—Care of Premature Children.

General introduction. Before leaving a case of midwifery, you should examine the baby to see if it is physically defective. You look into the mouth and see if there is cleft palate, examine the limbs, see that the anus is perforate, and if in doubt you push your little finger up into the bowel.

Having found the baby normal, you have to leave a few instructions about attention to it, and direct its progress day by day. Upon your skill in the management of infants, much of your reputation with the mother will depend. She is not capable of appreciating the true value of your aseptic technique, but she is a shrewd judge of the welfare of her child.

We make therefore a few general remarks on the care of infants, for the interpretation of their condition has to be made by a different process from that of the condition of adults' health. From slight and transitory signs, you will often have to gather sufficient knowledge to direct your treatment. Not only are physical signs in infants often transitory and difficult to interpret, but infants are exceedingly fickle in health. They may quickly change from normal health to serious illness and often as quickly recover from apparently hopeless conditions. You have, therefore, to be guarded in your prognosis, and you may meet with unexpected disappointments and successes that refuse to obey the laws of your previous experience. The history that the nurse or

mother supplies is frequently distorted by a desire to hear a favourable report. We therefore advise you to put leading questions concerning the food the child has, its frequency and amount, whether the child suffers from wind, sweating, constipation, diarrhoea, &c., with a thoroughness that should not be modified by the apparently simple and direct nature of the case.

We advise you too to pay great deference to the fears expressed by the mother or the nurse, even if the child looks well. They are constantly watching the child and have every opportunity of noticing the finer changes in the child's face and manner, which are particularly significant indices of its health.

Make a thorough physical examination of a child that is said not to be well. Ask the nurse or mother to undress it. The mother may say that the child has just gone to sleep or the day is cold, but tell her the child's health is more important. Be gentle with the child, when examining it, and don't frighten it. Have warm fingers and keen eyes. Finish your examination by light percussion, for percussion is apt to make a baby cry.

It becomes essential to know first what is a healthy baby and how it should be tended. We deal with the unhealthy baby in the last chapter.

The healthy baby

The great majority of babies are born healthy. Even the children of women dying from phthisis, heart disease, or starvation are frequently healthy in contrast to the perilously diseased condition of the mother. The natural law of the care for the race and indifference for the individual is borne out by the healthy condition of the baby at the expense of the dying mother. Any one, who sees a large number of the new-born babies of the poor, must be impressed by their capacity for health. They are firm, fat, and chubby. Nature gives them a good start. Their danger comes when they have to struggle with the disadvantages of slum civilization.

A healthy child is plump, is not sick, takes the breast or its bottle readily, does not have wind, has the bowels

open three to four times in the twenty-four hours for the first six months, and does not cry frequently nor long, certainly not more than half an hour continuously. Its temperature after the first three days should not be over 100°, when taken in the rectum. The pulse is variable. The faeces are soft, yolk yellow, and never green, nor have they white curds. The skin is without spots, and the tongue is clean without even one patch of white.

A healthy baby increases in weight about seven ounces a week, for the first two or three months, with the exception of the first week. Breast-fed babies illustrate this rule with most uniformity. Bottle-fed babies are more uncertain.

A baby's forehead should not be damp with sweat, when it is in its cot or perambulator. Sweating usually means that it is too heavily clothed.

Finally, the condition of the anterior fontanelle is an excellent guide to the baby's health. It is normally level with the bones. In ill health, it is sunk. More rarely in meningitis, and it is said before convulsions, it bulges.

When, therefore, you are called in to decide whether a baby is healthy or not, take all these things into account. If you find any departure from the normal, look carefully for any irregularity or unsuitability of the method by which the baby is being tended.

General directions for the management of a healthy baby. We think the first three days of a baby's life exceed others in importance. It is then that interference with the wishes of nature are frequent, and these we believe, are always to the detriment of a healthy baby.

Urine. The baby should pass its water within the first twelve hours. You always inquire as to whether it has done so. If you are told that it has not done so, it not infrequently means that the nurse has let the napkin dry. You need not be alarmed so long as you can feel no spherical tumour (the bladder) above the pubes. Wash with wet cotton wool the orifice of the urethra to free it of any smegma, give the baby a teaspoonful of cold water and put the baby in a hot bath. Put your hand over the orifice of the urethra and you will feel the stream of urine. If you do not, you need not

be anxious, unless you feel the full bladder above the pubes. Tell the nurse to put hot flannels on the hypogastrium and carefully watch the napkins for the next six hours. If at the end of that time she is sure that the baby has passed no water, she sends for you, and you must pass a sterile No. 1 silver catheter. This passes quite readily in either sex.

Meconium. The baby's bowels should be opened about six times in the first twenty-four hours, voiding dark green meconium. If within twelve hours no meconium has passed, put your little finger up the anus. If there is no imperforate anus, when you withdraw your finger meconium nearly always follows. If there is an imperforate anus you feel the obstruction. The operation for imperforate anus is given on p. 421. Meconium continues to come away for three to four days, after which the motions become pale yellow.

Condition of child after birth. When the child is born, no organ of its body springs into action at once, and yet there is a profound physiological change. The lungs supply the child with oxygen, but even though a baby has cried lustily, full inflation has sometimes been found to be absent when the body has been examined in cases of infanticide. The new paths of the circulating blood take time to become completely established. There must be a heat-regulating centre, which, like the circulation, is prepared to face the new conditions, but does not probably at once spring into full working order. Above all, the digestive organs take a little time to take on efficiently their new functions.

Importance of the above. Crying is the most efficient means of inflating the lungs, so if a baby does not cry well during the first twelve hours it should be made to do so. This is more important with weakly children, who have not given a lusty cry.

With regard to the heat-regulating centre, although there is no need to wrap the child up at once after birth, the room must be warm. It does the child good to kick about on the bed. Its bath, too, must not be under 100° F.

The abuse of the digestive organs is a common offence. Frequently, after a baby is born, it is given a little castor oil, some butter and sugar, milk and water, or the top of gruel.

We strongly disapprove of these practices. Nature has arranged that the welfare of the healthy child of a healthy mother can be best promoted by adhering to her own directions. The milk does not enter the breast until the third day of the puerperium. A little colostrum is secreted, and we believe its purpose is to accustom the baby's stomach and digestive organs to the function of digestion. Whether the colostrum has or has not a laxative action seems to us unproven and hence immaterial.

It has been shown, as we have already mentioned, that if the cord is not tied until pulsation has ceased, some three ounces of blood pass into the infant, which otherwise would not do so. It is also stated that the baby's body contains more blood at birth than it does at the end of three days. We think the baby may feed on its own blood before the establishment of the flow of milk. Be that as it may, we insist that neither medicine nor food, except colostrum, should be given to the baby until the time when the maternal milk supplies its needs.

Early flow of milk. In some cases the milk is abundant on the second day, and in such cases the baby is apt to take too much and too soon and so get indigestion. Put it to the breast sparingly to prevent this.

Late flow of milk. In other cases the milk does not appear until the fourth or fifth days. The baby gets hungry and cries. Give the baby the milk mixture described on p. 393, after putting it to suck what it can from the breast.

Breast feeding.

Times of feeding. Put the baby to the breast some six hours after its birth if the mother is awake. Twice in the first twenty-four hours, three times during the day and once during the night for the second twenty-four hours, suffices. Give it teaspoonfuls of water if it cries from thirst. From the third day onwards let the baby take the breast every two hours during the day and once during the night. Thus the baby is fed at 8 a.m., 10 a.m., 12, 2, 4, 6, 8, 10 p.m., and 3 a.m. Insist above all on regularity. Wake the baby up if it is asleep at the appointed time. Sometimes it is difficult to wake a baby or the sleepy baby refuses to take the breast.

If so, let it sleep until the next appointed hour has arrived. The discipline of regularity in meals is good for babies, as for adults, and lays the foundation of good health and temper.

A baby has a tendency to sleep by day and be wakeful at night. This tendency can be counteracted to the advantage of the parents by feeding the baby once only during the night. Once give way to the baby's crying and allow it to be fed at night, there will be little peace. In plain words, we think it necessary to gain the upper hand and not be bullied by the baby's irregular clamouring for food. The child, if dealt with in the manner we advocate, soon falls into the paths of discipline, and gains thereby the advantages of a well-ordered mode of existence. Its digestive juices are secreted with periodical constancy, and this periodicity is not upset by the offer of the breast whenever some capricious fancy causes the child to cry. The function of digestion also has timed periods of rest, the importance of which has been shown by the fact that, if a man of regular habit takes a meal at an unwonted hour, it will frequently remain unattacked by the digestive juices, until the customary meal hour arrives.

Upon digestion depends health, upon discipline stability of character, and we do not think these foundation-stones of a useful life can be laid too early.

Method of breast feeding. When the mother is in bed, she turns on the side of the breast which is to be used, and gives the nipple, which has just been washed with a piece of cotton wool and warm water, to the baby. She must be careful not to jam the baby's nose against the breast, so that it cannot breathe freely, whilst sucking. Sometimes, when the mother and nurse report that the baby is too weak to suck, this is the true reason, and you can detect it by watching the baby being suckled. Put the child to one breast only for a feed. The other breast is used for the next feed. If only one breast can be used it is better to give up breast feeding or at least to give the bottle alternately, for the milk that is secreted by the breast every two hours is generally too thin and poor in quality to nourish a baby. You can tell by weighing the baby (p. 402). *Twins* should have one breast each. If they do not flourish, one of them must be weaned.

How much shall the baby have? Our rule is—and it applies to both breast and artificial feeding—let the child have as much as it will take without posseting. If its stomach is too full the baby will posset the extra quantity. When it possets, give it less next meal. You can judge of the amount swallowed by the time the baby is at the breast. If the baby feeds for twenty minutes and possets, give the breast for fifteen minutes the next feed, and so on until the longest time the baby feeds without posseting is found.

Care of the nipples. Let the nipples be washed after suckling with boric lotion, and then dabbed with a little weak spirit (brandy and water equal parts) to prevent maceration of the epithelium. Before feeding the nipples are washed with warm water.

The nipples may be depressed, yet it is astonishing how a baby will draw them out. Speaking accurately, the action of a baby's mouth is rather to press back the tissues away from the nipple than to draw it out. This action the mother can also aid by pulling back the tissues around the nipple with her fingers or pressing them back with an umbrella ring. If the baby cannot get the nipple, let it try daily, and let the nurse draw the nipple gently out with clean fingers several times a day. The baby must suck through a nipple shield, as when the nipples are cracked (p. 370).

Attention to the nursing mother. Nursing women tend to eat too much. This is especially harmful during the lying-in period. They are encouraged to stuff, and stuffing brings on indigestion. Tell your patient to eat as much as will not cause indigestion and to keep her bowels regular by drinking plenty of fluid, eating fruit and green vegetables, and, if necessary, by cascara, senna, or other non-irritating laxative. We know the popular objection to fruits and green vegetables, but we have never found any bad results from their use.

If the milk begins to run short give the mother more fluid. There is a popular fallacy that milk given to the mother comes out as milk in her breast. This leads to the mother drinking milk between her meals, which takes away her appetite and gives her indigestion. Again, there is a popular notion that stout and beer given to the mother produce more

milk in her breast. This is probably right, for by drinking stout or beer she gets more fluid. The stimulation to digestion also enriches the milk.

Nervous shocks, too many visitors, and the unwise statements of nurses, all discourage a woman from efficient nursing. She is told that she will not be able to nurse, that she is too delicate, or that her baby is too strong. The nurse not infrequently says that the baby is cross and windy or that it is having too little milk. Do not give way to these suggestions, but urge the regular breast feeding and be very chary of any change. Finally, a nervous woman may find nursing very painful. Point out to her the great advantage breast feeding is to her baby. Even a week at the breast is a great advantage to the child.

Times of feeding in later months. After the end of the first month let the baby be fed every three hours during the day and once during the night. From the sixth month to the time of weaning it should have three-hourly feeds, and sleep throughout the night.

Drugs excreted in mother's milk. Purges given to the mother sometimes make the child cross. We think cascara sagrada has the least effect on the child. Belladonna, opium, and a prolonged course of bromides or iodides should be avoided in nursing women.

Women who cannot nurse.

1. Women who have some general disease such as phthisis or heart disease.

2. Women who have no milk. Very rarely women have no milk; more commonly deficient milk is due to keeping the baby from the breast and avoiding the stimulus of suckling.

3. Women with sepsis.

4. Women with interstitial mastitis.

5. Women who are insane.

6. Women who have lost a lot of blood during labour.

7. Women whose health is genuinely injured by lactation.

8. Women who have to go out and work for their livings.

A syphilitic woman can nurse her own infant safely. Finally, some women refuse to nurse their babies for personal

reasons. Urge upon them that the breast milk belongs to the baby, and emphasize the risks of artificial feeding.

How to stop the flow of milk. A tight binder round the chest, put on after labour, will prevent the onset of the milk in practically all cases. In private we spread lint with cere ointment (yellow wax 1, olive oil 8, warmed before spreading) and then a binder round the breasts. Many use belladonna liniment in place of the cere ointment. Give also a concentrated saline purge. Should the breasts swell and be tender, use the breast-pump sparingly to relieve pain, and repeat the treatment. Some give potassium iodide in 20-grain doses.

Babies that must be spoon fed.

1. Babies with unoperated cleft palate or bad hare-lip.

2. Babies with syphilitic and painful ulceration round the mouth.

Wet nurses. It is hard to get a respectable woman as a wet nurse, and artificial feeding is nearly always preferable. Sometimes, if a baby cannot be got to progress by any other way, wet nursing may rear it, but such cases are rare, and the milk of the wet nurse in many cases does not suit the baby. The essentials of a wet nurse are that she should be free from all suspicion of disease, especially syphilis, that her breasts should be healthy, and that her own child should be much the same age as the child to be suckled, and should be healthy.

Artificial feeding. Cow's milk is the most convenient and best food for infants after human milk. Ass's milk is said to be better, but we have had no experience of its use.

Differences between cow's and human milk. Cow's milk differs from human milk in having about twice as much proteid. The amount of sugar and fat is much the same as in human milk. Different analyses of different samples of cow's milk give different results, the fat being the most variable constituent.[1] For practical purposes the above is correct.

[1] Hutchison gives the following compositions of cow's milk and human milk during the first month of lactation.

	Cow's milk.	Human milk
Water	87 % to 88 %	87 % to 88 %
Proteids	2 % to 3 %	1·1 % to 1·5 %
Sugar	4 % to 5 %	6·2 % to 6·4 %
Fat	3·8 % to 4·5 %	3·1 % to 3·8 %
Mineral matters . . .	0·7 %	0·25 %

The curd of cow's milk is harder than that of human milk. The reaction of cow's milk, not immediately fresh from the cow, is acid from the presence of microbes. Human milk, on the other hand, is alkaline. For this reason the cow's milk should be as fresh as possible. It should certainly not be more than twenty-four hours old.

How to alter cow's milk to make it like human milk. It is now easy to work out a method of altering cow's milk to make it resemble human milk.

1. The proteid, or curd, is twice as much in cow's as in human milk. Dilute the cow's milk with an equal part of barley-water. The amount of proteid will now be approximately that of human milk.

2. The fat and sugar in cow's milk and human milk are in about the same proportion. The above dilution with barley-water halves the amount of fat and sugar in the cow's milk. By adding two teaspoonfuls of milk sugar (or one teaspoonful of Demerara sugar) and two teaspoonfuls of centrifugalized cream (45 per cent. fat) to every six ounces of the above mixture, you again restore the proper proportion of fat and sugar.

3. The curd of cow's milk is in larger and harder lumps than that of human milk. Barley-water mechanically divides up the curd of cow's milk. Citrate of soda, gr. j to every ounce of milk, or the use of lime-water in place of barley-water, makes the curd more flocculent.

4. The cow's milk is acid from microbes, while human milk is alkaline. The less the cow's milk is allowed to stand and the fresher it is, the less acid it will be. It is best kept in covered earthenware jars in a cool place. Sodium bicarbonate, although it makes the milk less acid, is not a good thing to give for long to a child. Lime-water is antacid, and may be substituted for the barley-water. It also makes the curd more flocculent.

5. The microbes are destroyed as far as possible by some form of sterilization.

The mixture. We now have our standard modified milk, which resembles human milk as closely as we can make it by simple methods, namely :—

Cow's milk	.	.	.	.	.	3 ounces.
Barley-water or lime-water		.		.	3 ounces.
Milk sugar	.	.	.	.	.	2 teaspoonfuls.
Centrifugalized cream		.		.	.	2 teaspoonfuls.
Citrate of soda .		.	.	.	.	3 grains.

How to give the mixture. Do not give this undiluted mixture until the third day. During the first twenty-four hours give the baby the mixture with three parts of water for three feeds. During the next twenty-four hours give the same for six feeds. This dilute mixture is intended to take the place, roughly, of the colostrum. On the third day use the above mixture as an exact substitute for breast feeding as regards time and amount. We think children up to one month old do as well, if not better, on this mixture, as on any other method of feeding. The milk mixture is always sterilized before use. The quantity required will be between one and three ounces at each meal.

Its constituents. *Barley-water* is made by adding two teaspoonfuls of well washed pearl barley to a pint of water. Boil for a quarter of an hour. It must be freshly made morning and evening.

Lime-water is a saturated solution, and made by shaking up unslaked lime with water in a clean bottle. Let this stand, and pour off the supernatant, clear fluid. It is better to make lime-water than to buy it.

Milk sugar can be bought from chemists. Dark Demerara sugar does almost as well, but one smoothed teaspoonful is equal to two smoothed teaspoonfuls of milk sugar.

Cream that has been centrifugalized at the dairy contains between 40 per cent. and 45 per cent. of fat. If you cannot get the centrifugalized cream, set aside some good fresh milk for about six hours and skim off the cream. This will contain about 15 per cent. fat, and you will therefore want five to six teaspoonfuls in the place of the two of centrifugalized cream.

When the baby is a month old. When the baby is a month old we believe that undiluted cow's milk is the best food. If we can get the baby nursed for one month we consider it a great advantage, for the digestion is much more stable at

the end of one month. We then put the baby on undiluted cow's milk, giving water between meals to allay thirst. We do not believe a baby's digestion is as dainty as it is commonly supposed to be when only a month old. If water is added to the milk, not only is the milk diluted but the gastric juice is diluted also. It is not easy to tell whether the advantage of diluted milk outweighs the disadvantage of diluted gastric juice. But practice has solved this question for us, for we certainly get better results with whole milk than with diluted milk. It also has the advantage of simplicity.

Feeding with pure cow's milk. Undiluted cow's milk offers a baby the right amount of fats and carbo-hydrates. Only the casein is in excess. This excess is passed per rectum. The stools are large, they are often whitish from unused curd, which matters nothing so long as the baby is well. There is rarely constipation. The milk and the milk mixture given throughout the first month are always sterilized before use. Boiling impairs its nutritive qualities, whereas sterilization hardly does so. Sterilization does not render the milk completely germ free. It does not kill spores, and in some instances babies have died of acute choleraic diarrhoea, although only fed with carefully sterilized milk. These cases are very rare, and the better nutritive qualities of sterilized milk, as opposed to those of boiled milk, warrant the risk of such rare disaster. By sterilization most organisms, the tubercle bacillus, the typhoid bacillus, and the bacillus coli, &c., are killed. We add citrate of soda to the whole milk in the proportion of one grain to the ounce as in the mixture.

Water and times of feeding with pure milk. Pure milk, as we have stated, is deficient in fluid, therefore the baby wants water between meals and is given it with a teaspoon. Pure milk is also a more concentrated food and feeds need not be so frequent. Every three hours is sufficient, and after the third month four-hourly feeds suffice.

Method of sterilization. The apparatus used at the Rotunda is the Soxhlet milk sterilizer. It consists of a cruet-stand which holds ten bottles and fits into a saucepan. The bottles are filled with milk or mixture, one feed in each bottle, which will mean between $2\frac{1}{2}$ and 5 ounces the first six months, and

between 5 and 10 ounces the second six months. Cover the mouth of each bottle with the little rubber cap. Pour water into the saucepan until three-quarters of the height of the bottles are immersed. Then raise the water to boiling-point. The milk does not itself boil. It only attains to a temperature of 160° to 170° F. The mixture is kept in the boiling water for ten minutes, for a longer exposure diminishes its nutritive qualities. Whole milk is kept in the boiling water for half an hour the first three months, after which a quarter of an hour suffices. It is best to sterilize morning and evening. The
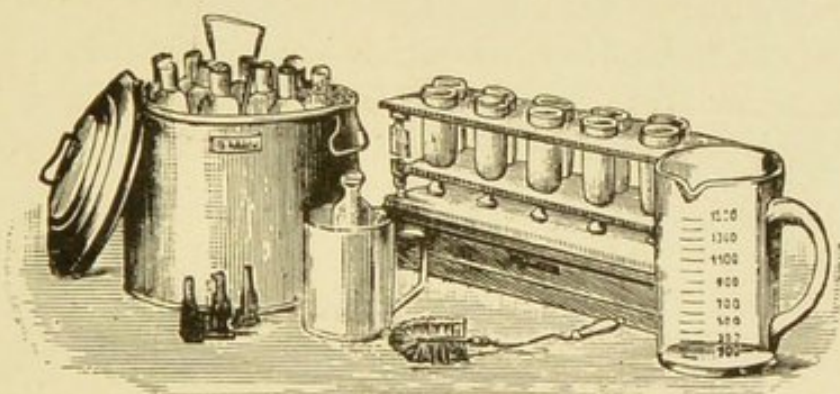
Fig. 167. Soxhlet's milk sterilizer.

rubber cap, which gets sucked a little into the mouth of the bottle as the latter cools, keeps the air from the contents. Cool the milk rapidly by plunging the bottles into cold water.

Giving the baby the bottle. When the baby is to be fed, the nurse takes one bottle, warms the milk in it by putting the bottle in warm water, removes the cap, and with clean fingers fits on a rubber teat. These rubber teats she scrubs inside and out, boils once a day, and keeps in soda solution. The baby is fed straight from the bottle. There is, of course, no air vent, but the baby manages its feed successfully, letting go of the teat occasionally to let air enter. If it seems to have difficulty, see whether the hole in the teat is large enough. Feeding by the bottle takes a long time, sometimes up to half an hour, but this is not a disadvantage to the child. The baby must always be fed, never allowed to suck the bottle in its cot, sleep, wake and suck again.

After the sixth month. The first teeth come about the

sixth month. We then thicken the milk with a little infant food, preferably Mellin's, Benger's, or Frame food. Put a teaspoonful in a saucepan with some milk and boil for five minutes. Add the thickened compound to the bottle contents. From the tenth to the twelfth month we wean the baby from the breast or bottle.

Food for poor children. Poor mothers are unable to make the mixture we advocate, or to buy a Soxhlet's sterilizer. You can give them a bottle of citrate of soda, and they can buy some Demerara sugar and cod-liver oil.

After the second day, then, the babies of poor parents, such as many of our hospital babies, have as artificial diet :—

Milk . . .	$\mathfrak{z}$ iij
Barley-water .	$\mathfrak{z}$ iij
Demerara sugar	One smoothed teaspoonful
Citrate of soda .	A pinch
Cod-liver oil .	Five drops, which can be added after sterilization, if needed (p. 406).

For sterilization, they can put the mixture in an ordinary bottle and put the bottle into a saucepan of cold water. Then boil the water in the saucepan for ten to fifteen minutes. If this cannot be managed they can put the feed in a small saucepan, raise it to the boiling-point, and then let it cool rapidly by putting the saucepan in cold water. The mixture should be kept in a clean corked bottle put to stand in cold water.

Keeping the bottles and nipples clean. This is an important part of baby feeding. The remnants of milk about the nipple or in the bottle, form food for microbes, and these microbes are ingested by the baby and poison it. There is no more common cause of infantile illness than this.

The bottles are scalded inside and out before and after feeds, and kept in a solution of soda. The bottle must never have any rubber tubing. It must be of the boat shape. It is better to keep two in use.

The nipples are scrubbed before and after each feed with soap and water, inside and out, and boiled once a day and kept in soda solution.

Position of the baby whilst feeding. Let the nurse always

hold the baby on her arm. As we have said, the baby must not have the bottle in its cot.

Mixed feeding. If a baby does not gain in weight on breast feeding alone, we sometimes give the bottle with a little Mellin's or Benger's food once a day, and also for the night feed, provided the baby is over three months old.

Weaning. Wean the baby about the tenth or twelfth month and feed it with a spoon. If breast-fed and it is stationary in weight, wean before this. Begin with one spoon feed of whole milk once a day. If the child keeps well give it alternate breast and spoon feeds. Sometimes it is convenient to give the bottle instead of spoon feeds, and the baby is weaned from the bottle at fifteen months. At a year old the baby should no longer have the breast, weaning thus taking a month to two months.

Do not wean a breast-fed baby in hot weather, when diarrhoea is prevalent, but wait until the period of summer diarrhoea has passed.

There is no need to wean the baby because the menses start.

The diet of children after weaning does not come within the province of the obstetrician.

General conditions of a baby's welfare

Fresh air. Fresh air is very important to the health of a baby. We advise that it should be taken out into the fresh air after the first day, unless rain is falling or the air is damp or very cold. The sooner, too, it is put in a perambulator the better. It will get more fresh air in a perambulator, for it is less tedious for a nurse to wheel a perambulator than to carry the baby, and consequently she will stay out longer. It is good we think to keep the baby out in the sun all day, except at meal times. If the child is well wrapped up it will not catch cold. It should lie prone, for this is the natural position.

The nursery windows should be open night and day, winter and summer. They may be closed whilst the baby is bathed, although we know from experience that babies do not catch cold if the window is open.

The bath. For fear of the cord becoming wetted, it is ad-

visable only to give the baby a shallow bath, until the cord has separated. The cord is not submerged in a shallow bath. Soap, after the first bath, should not be used with a very young baby. Rubbing with a towel is too severe for a baby's delicate skin. It should be dabbed with the towel to dry it. After this the groins, buttocks, and armpits are dusted with some powder such as boracic acid 1 part, zinc oxide 3 parts, starch 6 parts.

When the cord has separated, which it does between the fifth and tenth day, the baby has a bath morning and evening. The temperature of the water should be 90° F. The nurse should never immerse the baby's head, but hold its head with her left hand.

Care of the eyes and mouth. In a healthy baby the eyes should be sponged with cotton wool wipes and warm water night and morning. The mouth should be cleansed three times a day with soft linen and warm water. The nurse wraps the linen on her little finger and so wipes out the mouth.

Care of the cord. The cord is dressed daily. It is first dusted with the powder given above. A piece of scorched gamgee tissue or scorched linen is then cut halfway down the centre, or a hole through which the cord can pass is cut in it. The tissue is drawn round the cord and folded over it with its scorched surface to the cord. It is kept in its place by the binder. By keeping the cord dry, separation is best effected. Sometimes a small weeping surface is left. Treat this with zinc ointment or boracic powder.

Care of the prepuce in a male child. The prepuce should be pulled back a little day by day by the nurse, and the surface of the glans sponged. In a few days the nurse will be able to completely retract the prepuce. From that time on when the baby is bathed, the prepuce should be drawn back and the glans cleansed.

Sleeping. We advise that a baby should always be kept, when indoors, in a separate cot, except at meal times. If the child is nursed to sleep in the mother's bed, it will get accustomed to this soporific nursing, and cry and be wakeful without it. Above all, do not let curious visitors be con-

stantly handling the baby and spoiling its sleep. Let it be put back to the cot immediately after a feed. Jigging a baby after its feed is very harmful. We advise against the room being specially warmed and treating a baby like a hothouse plant. The ordinary temperatures that suit adults suit the baby just as well. It should sleep with its face exposed to the air and not covered by a blanket, or thick veil, when in its perambulator.

Clothing. The principal fault in the clothing of babies is that it is too thick. You can tell when the clothing is too thick by the sweating of the baby. The forehead is moist and the baby is often fretful. Nor should the clothing impede the movements of the child. The clothing must not be tight round its chest or abdomen. It must be able to kick freely and move its arms, for exercise is important to the baby's progress.

Crying. A healthy baby does not always cry because it is hungry. It may be thirsty. Giving it two or three teaspoonfuls of cold water will quickly decide the point. If this does not stop its crying, it may be too hot or its feet may be cold; its napkin may be wet or soiled; a pin may be running into it; a flea biting it, or it may be fretful from too much attention, when it wishes to sleep. A change of position in the cot will often stop the crying. If it continues to cry, remember that crying is one of the chief signs that a child is not well.

General information about the normal baby.

At 6 weeks a baby begins to observe and hear. If a child turns at a sound, it is not deaf and will not be dumb.

At 3 months a baby holds up its head.

At 6–8 months the two lower central incisor teeth appear. The four upper incisors next appear between the ninth and twelfth months.

At 8 months a baby should be trained to go without napkins. They should at first be removed for several hours and then replaced. The baby will get accustomed to regular habits in this way.

At 12 months the baby begins to walk.

At 12–18 months the baby begins to talk.

Care of premature children. Premature children are apt to do well for a week or so and then die suddenly. We think the principal reason is want of fluid. They require to be kept warm in gamgee tissue, or in an incubator to imitate the heat of the uterus. They therefore perspire and so lose fluid, as well as by passing urine and faeces. The stomach is very small and they may take nearly an hour to swallow a teaspoonful of fluid. Hence our rule is to give water by enemas, as well as fluid by the mouth. Our hospital routine is—

First day. Water by mouth. One or two teaspoonfuls of peptonized whey. Three to four enemas of ℥ss. of normal saline.

Second day. Four meals of peptonized whey. Enemas as before.

Third day. Peptonized whey, unless milk is established. If the baby is too weak to suck, draw off the milk with a breast pump and give it to the child by a teaspoon or by a small glass pipette. Enemas as before.

From the fourth day. Give two enemas of ℥j daily, until the baby is taking enough fluid. The milk flow should by now be established. If not, give the milk mixture, but dilute it at first with equal parts of water.

CHAPTER XX

THE UNHEALTHY BABY

Symptoms and Methods of Examination—Ill Feeding and Alteration of Food Mixtures—Diarrhoea, and Green Stools—Vomiting and other Early Complaints—Later Complaints—Infantile Convulsions—Ophthalmia Neonatorum.

WE have in the last chapter described the healthy baby and dealt with its management. We have now to deal with the unhealthy baby. Frequently the signs of illness are so obvious, when you are called to see the baby, that you immediately set to work to discover what is wrong with the baby. But at other times the signs are indefinite, they may hardly awaken your suspicions. The mother, eager to do the best for her baby, brings it to see you at fixed periods in order to assure herself that you are satisfied with its progress. The responsibility of its welfare then rests on your shoulders, and you feel easier if you have some definite measure by which you are able to test the baby's fitness and the suitability of the method by which it is being reared. This measure you have in a careful record of the weight of the baby. It is well worth while keeping a set of baby scales in your consulting room.

How to judge of the progress of a child by weight. A healthy baby increases in weight about seven ounces a week for the first three months of its life. This increase is best exhibited by breast-fed babies. The progress of the increase in weight is often irregular, but in three weeks you will expect to find an increase of some fifteen to twenty ounces. If you do not, your suspicions that the baby is not perfectly healthy are aroused. A baby of seven pounds at birth

averages twelve to thirteen pounds in weight at three months, fourteen to sixteen pounds at six months, and twenty pounds at twelve months.

How often should a baby be weighed? A baby should be weighed once a week for the first three months of its life and less frequently later. But remember to weigh it at the same time of day, and not one week before, and another week after a meal.

Gain in weight of bottle-fed babies. Babies that are bottle fed from birth sometimes gain very little in weight for the first month. Provided the baby shows some increase in weight you can be satisfied with the care it is getting.

Significance of the weight of a baby. As has been said, the weight of a baby is the best test of its progress. If some of the characteristics of a healthy baby are absent, if, for example, it cries frequently or seems to have colic or is constipated, and yet week by week it gains in weight, you need not be anxious about the nature of the food it is getting, although you should pay attention to the quantity of the food and the régime of careful upbringing.

It is, indeed, a cardinal rule of baby feeding not to change the nature of the baby's food, unless there is definite evidence that it is losing or not gaining weight. Every change in diet involves the risk of a few days' nutritive disturbance, whilst the baby is getting accustomed to the new food. If it is not gaining weight, it must be classed as an unhealthy baby and most probably will have other signs of ill health.

Examination of the unhealthy baby. When you are going to make a physical examination of a baby, you should ask the nurse to undress the baby completely before a fire. It is difficult enough in many cases to find exactly what is wrong with a baby, but it is made still more difficult, if the clothes are only opened or pulled up to permit of your examination.

You should now, with warm hands, feel the baby's limbs, paying attention to the *epiphysial lines*, any tenderness of the lower limbs and the soles of the feet for pemphigus. If the baby is a boy, see if he has a tight foreskin, for a *tight foreskin* will sometimes make a baby cry for long periods

after passing water. Then notice the child's buttocks and see if they are red. *Red buttocks* are a common accompaniment of diarrhoea. Examine the *groins* to see that the skin is soft and not excoriated, also the *inside of the thighs,* which may be excoriated by napkins which are too bulky, or allowed to remain on when wet, or hard and sent back with alkali present from the wash. Then examine the *abdomen.* The abdomen is prominent in a baby. You assure yourself that the abdomen is normal or detect any default. So too with the *chest.* You notice whether its conformation is regular, whether the breathing is very rapid, whether there is any sucking in of the lower ribs with inspiration, and in older children any signs of beaded ribs, i. e. the rickety rosary. You listen over the *lungs* with your stethoscope and you listen to the *heart* for congenital heart murmurs. You examine the hands and the palms for pemphigus. You then pass on to examine the head, and above all feel the *anterior fontanelle,* whether it is flush with the bone as in normal health, or sunk as it is in ill health, or bulged as in meningitis. The sinking in of the anterior fontanelle is *a most reliable sign* of ill health in an infant. You feel the forehead to see if it is moist. Moisture of the forehead means that the child is too hot or that it is rickety. Notice if there is any sign of snuffles or cold in the head. Examine the child's mouth. Look for that rare condition, tongue-tie, and for cleft palate. See if there is any thrush, and lastly press down the tongue with your little finger or with the handle of a teaspoon to see the throat. This will make the child cry, and therefore you should leave this until the last.

Importance of examination. Further details of examination are described in books on the medical and surgical diseases of children. We are only anxious to insist that a systematic examination of the child will save you from making blunders. It does not take much time, and its general nature will put you on to the track of any particular disease that is present and lead to its special investigation. As an example of the danger of omitting a physical examination, we remember a case of a baby that wasted. Various

changes of diet and different medicines were tried without avail. Eventually the child was stripped and a large abdominal sarcoma was found. Or, to give a more homely illustration, we remember being called to stop a long screaming fit in a baby, and on undressing the child we found that the binder had been sewn through the child's skin.

Further investigation. You next turn your attention to the *condition of the napkins,* which should be kept for you by the nurse or mother. The nature of the *stools* is of great importance. In health they are soft and light yellow. In ill health they may be green, they may contain curds, undigested fat, slime, mucus, and sometimes blood; or on the other hand they may be hard and dry.

Notice also whether the *urine stains the napkin.* When a baby's urine stains the napkin, it means that it is not getting enough fluid.

You next pay attention to the *food.* If breast fed, look for sore nipples in the mother and inquire as to the care and cleansing of the breasts, the number and times of the feeds the baby gets, and notice how she suckles the baby. If bottle fed, ask how often it is fed, how the food is prepared. Look yourself at the bottles and the teats. Ask how the milk is sterilized and how the bottles are kept clean.

Then inquire into the general hygiene of the baby, how it is clothed, how it sleeps, how often it goes into the fresh air, what sort of appetite it has, and how often the bowels are open.

Ask whether it cries much, and, as we advised you in the introductory remarks on children, pay careful attention to the fears and opinions expressed by the mother and nurse who are constantly watching the child.

Value of the knowledge you have gained. You should now have gained some sound notion as to why the baby is in ill health. In the majority of cases you will find some mismanagement. Ill health in a baby of healthy parentage is almost certainly due to some error of management, more rarely due to some congenital or acquired disease. It is your duty, when you discover some error of management, to lay down precise rules for better management, and it is essential

that a young doctor should have these at his command now-adays, for many mothers study the question of baby-management in small handbooks and can easily expose his ignorance.

REASONS FOR ILL HEALTH IN A BABY, AND THEIR TREATMENT

A. **Reasons connected with the feeding.**

1. The food may be too strong.
2. The food may be too weak.
3. The food may be unsuitably given.
4. The baby may not be able to suck properly.
5. The baby may not get enough fluid.
6. The food may be unsuitable.
7. Accompanying these, the baby may have colic, vomiting, diarrhoea, or constipation.

B. **Other reasons.**

8. The baby may be kept too hot, in stuffy rooms, and not allowed to have sufficient fresh air and exercise.
9. The baby may have some general disease.

1. **The food may be too strong.** A baby may fail to increase in weight because its food is too strong.

Signs. When the food is too strong, the baby will often be sick after each feed, vomiting up the contents of its stomach, and not merely posseting the extra quantity it does not require. It will also probably have colic, as evidenced by its screaming, drawing up its legs and hardening its abdomen.

It is in the stools, however, that you find most definite signs. In the stools you obtain evidence that the food is too strong to be properly digested by finding undigested curd and fat. Either you find separate lumps or else these coalesce so as to make a stool that is somewhat white in colour These signs occur almost exclusively in bottle-fed infants, and you must watch for them with especial care when the baby is first given the bottle.

We must here repeat that when a baby is fed on whole milk, you not infrequently find these whitish stools. Yet the baby is not ill, but is thriving and putting on weight. In such cases there is no occasion to change the baby's food.

What to do. Dilute the milk mixture, or milk and barley-water. Begin by adding one-third of water; for instance, to six ounces of the mixture add two ounces of water. Substitute lime-water for barley-water, for lime-water is more likely to aid digestion. If the food still seems too strong, dilute with an equal quantity of water. Try, too, giving the feeds every two and a half to three hours instead of every two hours.

If these measures fail and the child is still in ill health, the food is unsuitable to the baby. But give the diluted milk a fair trial of three days to a week. The baby does not always show immediate improvement when given a diet that eventually proves suitable.

2. **The food may be too weak.** This is a less likely reason of ill health with babies fed on the milk mixture than the milk mixture being too strong. Breast-fed babies may find the mother's milk too weak.

Signs. The baby does not gain properly in weight. It cries and whines with hunger. When the feed is finished, it does not fall contentedly to sleep, but may continue to whine, and is wakeful. It will be constipated. Frequently the signs of insufficient fluid are present, namely, a urine that stains the napkin, and hard, dry stools.

What to do. If the baby is on the milk mixture, add another teaspoonful of sugar and cream to the six ounces. It is most unlikely that this will prove too weak, but if it does, decrease the quantity of barley- or lime-water. Be sure first that the baby is sucking properly and getting large enough and long enough feeds.

If the baby is on milk and barley-water, give it cod-liver oil, ten drops three times a day, and decrease the amount of barley-water.

In both cases give water between meals.

If the baby is breast fed, we would advise you to give occasional bottle feeds as a substitute for one or more breast feeds. The breast has then longer to fill and the milk becomes more and stronger. Pay attention also to the health and diet of the mother. Mixed feeding is often very successful.

If the baby still does not thrive, you must direct attention to the additional food stuffs given under the sixth reason.

3. **The food may be unsuitably given.** *Irregularity* in the times of feeding is an exceedingly common cause, perhaps the commonest cause of interference with a baby's proper progress. Some mothers give the baby the breast whenever it cries. The food stops the baby crying for a time, for food stops the pains of indigestion in a baby, as it does in an adult. Later, the baby cries again with pain, and is again fed. Another reason is, that the baby is not put to rest after its meals, but is taken to see some friends or relatives and as likely as not is jigged up and down by them.

We have already insisted on the importance of cleanliness in the method of food. It is a point, which one cannot impress upon the nurse or mother too emphatically.

Lastly, the food may be given too fast. Greedy babies often posset the milk during a meal.

What to do. Insist upon regularity of meals and upon rest for the baby after its meals. It can be put to rest either in its cot or perambulator.

When you go to see a baby, always see that the mother or nurse pays strict attention to cleanliness in the giving of food.

If the baby is very greedy and gulps down its food as fast as it can, tell the mother to squeeze the nipple a little to prevent a too rapid flow of milk. In both breast-fed and bottle-fed babies you can easily regulate the speed of a meal by taking the baby from the breast or bottle and making it rest for a minute or two.

4. **The baby may not be able to suck properly.** The causes which prevent a baby from sucking are (1) depressed nipples, (2) the jamming of the baby's nose against the breast, (3) bad hare-lip, (4) cleft palate, (5) tongue-tie, (6) prematurity, (7) too small a hole in the rubber teat, so that the baby cannot get enough.

True tongue-tie is very uncommon but does occur. It is easily cured by nicking the fraenum with scissors, which is without danger to the lingual artery. You can deepen the nick with your finger nail, if the tongue is not freed sufficiently.

Hare-lip and cleft palate. Some surgeons advise operation in the first month of infant life for both these defects, so as to avoid the inefficient nutrition that results from the awkward process of spoon feeding.

5. **The baby may not get enough fluid.**

Signs. The baby is constipated, with dry, hard stools, and the urine stains the napkin. The baby cries with thirst and its crying is stopped, if water is given to it.

What to do. Give the baby as many teaspoonfuls of cold water between meals as it will take. This is especially necessary when the baby is fed on whole milk.

6. **The food may be unsuitable.**

Signs. The baby does not increase in weight as it should do. It may have in addition, vomiting, constipation, colic, or diarrhoea, signs to which special attention will be paid in the next paragraph. You judge that the food is too strong, too weak, or unsuitably given. You go into the question of amount, the ability of the baby to suck, the quantity of fluid it is getting, its clothing, and fresh air, all without avail. The changes you effect in its régime do not bring about any improvement within a week, or at the end of a fortnight there has been no proper increase in weight. If the baby is in the first month of bottle feeding, you are aware that there is a slower increase in weight than is common at other times, and yet you are not satisfied. You decide, therefore, to change the diet of the baby.

What to do. These cases have to be treated on much the same principles as you treat malnutrition or dyspepsia in an adult, that is to say, you attempt to find out what is unsuitable in the diet, and you make tentative attempts to find a diet that is suitable. Again we think it is a mistake to regard babies in too general a light. They, like adults, have their individual likes and dislikes. The aphorism, that what is one man's food is another man's poison can be applied, if shorn of some aphoristical emphasis, to babies. For example, you are perpetually warned in textbooks of the danger of giving starch to infants under three months old, and you are given as a reason that a baby possesses no amylolytic ferments. Yet we have been guilty many times of disregarding the dogmas

of physiology and have added to the diet of ill-nourished babies of under a month old, Mellin's, Benger's, and Frame food, and the babies have done very well. Even should they fail to digest unconverted starch, we do not see that any great evil need necessarily result, for they can pass the extra food in the stools, just as many adults do daily, without harm, who over-eat themselves. We are not, however, advocating any indiscriminate use of patent foods, but are protesting that experience shows that a greater licence can often be allowed to a baby's digestion than is nowadays allowed to it by the rigid laws of chemical analysis and physiological experiments.

We are now dealing with a baby which is not progressing, which has perhaps some signs of digestive disturbance, but these signs are not urgent enough to call for immediate and radical treatment. In short, we are dealing with a baby with which we are not satisfied, but about which we are not really anxious

Constituents of the diet over which you have control. You have control over the diluent, the fat, the sugar, and the casein.

The diluent. If you are diluting the milk for the baby, it is possible that the diluent itself does not agree with the baby. *Barley-water* does not always agree with babies, and if a baby has wind and colic, or if it is constipated (in which case, food kept back in the bowel is likely to ferment) it is often well to leave off using barley-water and to try lime-water.

Lime-water is also good, when the baby has any signs of gastritis, such as vomiting Lime-water is antacid and is a sedative to the stomach. In place of lime-water you may use plain water with a grain of sodium bicarbonate as an antacid to each ounce of feed. Rice-water can also be used, when there is any tendency to looseness of the bowels, or oatmeal-water when there is constipation. You make both in the same way as barley-water. Finally, plain water is often the best diluent of all.

The fat. A baby may be getting too much or too little fat.
Too much fat. You can usually tell when a baby is getting too much fat. Fat in excess affects a baby as much as it does an adult. It takes away its appetite, often makes it sick, and

gives it slimy stools, on which actually whitish smears of undigested fat may be seen. In such a case you should give less fat (it may often be wise to decrease the sugar as well). It is easy to decrease the amount of fat in the milk mixture by leaving off the cream. If this is not sufficient, it is quite easy to reduce the fat further, either by using a separator or by letting fresh milk stand in a cool place and skimming off the cream. The amount of fat as cream that can be skimmed off depends on the hours you allow the milk to stand. Roughly, if the milk is allowed to stand for two hours, the milk in the upper half of the jug will contain twice as much fat as the milk in the lower half. The curd produced by clotting milk entangles most of the fat, so that whey contains much less fat than milk. Whey, in fact, contains 0·5 per cent. of fat at the most, whereas cow's milk contains 3·5 to 4·5 per cent. If, then, the baby seems to lose its appetite, is sick or regurgitates its food between meals, and has slimy, sometimes very offensive stools, you should certainly reduce the fat, and you can do this by stopping the addition of cream, then by separating the cream from the milk by a separator, or by using the lower half of milk that has stood two hours; and lastly, if the signs of indigestion continue, by resorting to whey.

Too little fat may be the reason why a baby does not flourish. If a baby does not increase in weight as you wish, and has not got signs of indigestion, it will very likely take more fat with benefit. Therefore, add cream to its diet, or cod-liver oil. Begin with half a teaspoonful of cream or five drops of cod-liver oil to each feed. Even a breast-fed baby may be the better for ten drops of cod-liver oil three times a day after a meal.

Sugar. A baby may suffer from having too much or too little sugar.

Too much sugar gives rise, like too much fat, to signs of indigestion. Vomiting may be constant, when the baby is having too much sugar added to its feeds. Flatulence, with or without colic, is another sign of too much sugar, and flatulence is especially apt to occur with constipation. The sugar is shut back in the bowel and fermentation takes place. If flatulence is the only sign that the baby is having too

much sugar added to its feeds, it does not matter much, but if vomiting is added, you must reduce the amount of sugar or stop adding any at all to the feeds. As a note, it may be mentioned here that Nestlé's milk, with which we deal later, upsets children sometimes because of the excess of sugar.

Too little sugar is sometimes a cause of non-progress and we advise you to add a little extra sugar tentatively to the feeds of a baby, which, though otherwise well, is not gaining in weight as it should.

Casein. We now come to the constituent of cow's milk that is the most troublesome for the baby's digestion. We have seen how we at first diluted the milk because of the casein, and how we added lime-water or barley-water and citrate of soda to make the curd more like the curd of human milk; in fact, the modifications of cow's milk are really modifications directed to make the casein more digestible. Yet in spite of all these modifications, the indigestibility of the curd of cow's milk is still the great obstacle to success in the artificial feeding of infants.

We have already dealt with the question of too little casein under the heading of the food being too weak. Fear of the indigestibility of casein has led some doctors to dilute the milk to such an extent that there remains very little nourishment for the baby at all in the weak milk. We, on the other hand, start the baby with as near as possible the same percentage of casein as it would have in its mother's milk. At a month old, we go one step further and give the baby whole milk. We have found this bolder policy of calling upon the baby's digestion to do good, hard work has answered much better than treating the baby's digestion daintily, as if it were an invalid from the time of birth, and could not be asked to digest anything stronger than milk diluted with three or four times its bulk of water. In fact, we believe this timid policy defeats its own end by diluting the power of the gastric and intestinal juices as much as the milk they have to digest. Still, although the stronger foods certainly seem to be advisable, there are babies which fail to digest casein properly and suffer in health from their disability.

Too much casein is shown chiefly by colic, and curds in the

whitish bulky stools. When the baby has colic it screams with sudden pain, draws its legs up and hardens its abdomen. Vomiting is more often due to the fat or sugar. Occasional colic is not uncommon in babies, and when accompanied by progressive increase in weight is of no moment. But when there is colic, with curds in the stools, and perhaps diarrhoea and deficient progress, the quantity of casein given to the bottle-fed child must be lessened. Remember, too, that if you are not sure as to which of the food ingredients is the cause of the baby's indigestion, you are more likely to get good results by first altering the casein.

How to decrease the amount of casein. The simplest way is to increase the amount of diluent. Thus you can make up your six ounces of milk mixture by having two ounces of milk, instead of three ounces, and four ounces of diluent. Another simple method of decreasing the amount of casein is to feed the baby every 2½ to 3 hours instead of 2 hours, increasing the amount of cream and sugar by adding an extra one-third of a teaspoonful of each. This may not be sufficient; the lack of progress, with colic and curds in the stools, may continue.

You have four means left of altering the casein—

(a) By some form of whey and milk mixture.

(b) By giving condensed milk.

(c) By giving peptonized milk.

(d) By the use of patent foods, to which we add the use of grey powder and citrate of soda.

(a) **Whey mixtures, or milk and whey mixtures.** Whey contains less than 1 per cent. of proteid and therefore this is a very efficient method of decreasing the casein. The amount of fat is also reduced to about one-fourth, but the sugar and salts, being in solution, are not altered.

You make whey by adding two teaspoonfuls of Fairchild's pepsin to a pint of new milk. Warm, stir, and leave until the clot is firm. Break up the clot and strain through muslin. Fairchild's pepsin powders are rather bitter and a child will often prefer pepsencia whey (see p. 145). The whey takes the place of the milk in the mixture. Thus whey mixture has the following constituents :—

Whey   .   .   .   .   3 ounces.
Water or other diluent   .   3 ounces.
Milk sugar   .   .   .   2 teaspoonfuls.
Centrifugalized cream   .   3 to 4 teaspoonfuls
                         (owing to loss of fat in the curd).
Citrate of soda .   .   .   3 grains.

This mixture is the same as the milk mixture, except that it has two to three times less proteid, for whey has two to three times less proteid than milk. You manage with it as you do with the milk mixture, and if the baby shows signs of having too much fat or sugar, you decrease them in the same manner as in the milk mixture. As the child improves you can gradually substitute milk for whey.

(b) **Condensed milk.** Poor mothers cannot make whey mixtures properly, and you are advised to give condensed milk in the place of whey mixtures to poor babies. Nestlé's milk is the one commonly used, because it is the best and the easiest to get. Start with one *full* teaspoonful of Nestlé's to ten of water. There is no need for barley- or lime-water. The casein of condensed milk is more rapidly digested, but the fat is deficient. Therefore add five drops of cod-liver oil to each feed, or give ten to twenty drops three times a day after feeds.

(c) **Peptonized milk.** Where whey mixtures fail, peptonized milk will sometimes succeed in nourishing a child, but we prefer to try whey mixtures thoroughly first. You peptonize milk by means of Fairchild's powders. Take half a pint of milk, add a pinch of sodium bicarbonate to it and a Fairchild's powder. Stir them, and keep the mixture for twenty minutes at a temperature of 110° F. Then raise quickly to boiling-point to stop the action of the ferment, and cool. Dilute with one, two, or three parts of water, and add a little cream and sugar, tentatively at first, because a baby that must be fed on peptonized milk has little healthy digestive power. Gradually, as the baby improves, you decrease the time the powder is allowed to act, and you increase the amount of fat and sugar, until your mixture returns to the composition of the milk mixture, or some other mixture with fresh milk that suits the baby.

(d) The use of patent foods, grey powder, and citrate of soda.

Patent foods. It is difficult to lay down any rules for patent foods, but when a baby is not putting on weight the addition of some infant food to the bottle will often improve the child Patent foods can be added to milk, or when the casein is badly digested they can be made up with whey, or can be made with water only. The directions are given on the packages.

Thus, for a child that seems unable to digest milk in any form, and fails to progress properly on a whey mixture, Allenbury No. 1 food made with water can be tried as a temporary substitute. When the child's digestion has improved, begin to add a little milk to the food. Mellin's and whey together make a good food in some cases. Savory and Moore's, and Benger's foods we have also found of real use in quite young infants who were going progressively backwards or were stationary on other foods.

We use Frame food by preference, as an addition to the milk of children over six months, if they seem in need of more food.

Grey powder. The practical experience of all doctors who have had to with babies, is unanimous in the value of grey powders for babies that are not progressing as they should, whether they are syphilitic or not. Give, in such a case, a grain of mercury and chalk powder twice a day, until the child is once more progressing on a suitable diet. Do not continue when the baby is well again, for a long course of mercury has a bad influence on the development of the teeth.

Citrate of soda. We think it is a good thing to add citrate of soda to all foods in the proportion of one grain to the ounce. It may be a prophylactic against scurvy.

Summary of changes of diet for a baby that does not progress in weight. Find out whether the food is too strong or too weak, whether it is suitably and cleanly given; whether the baby is able to suck properly and has enough fluid, and treat accordingly. Then pay attention to the diluent. If the food upsets the baby, find out if you can whether fat, sugar,

or casein is at fault. If alteration of the constituents of milk mixtures together with dilution do not enable the baby to digest properly, resort to whey mixtures, or in the place of whey mixtures, for a child of poor parents, use condensed milk. If whey mixtures fail, try dilute peptonized milk. If you are still dissatisfied, try either the addition of some patent food to dilute milk or whey ; or in bad cases try a patent food such as Benger's or Allenbury No. 1 alone, for a time. Give grey powder in these cases. Always carefully examine the baby and discover the other conditions of its life, and finally remember that a baby takes a little time to get accustomed to a change of diet and you must not therefore hastily abandon a new diet, because the baby does not show signs of immediate improvement.

7. **Colic, vomiting, diarrhoea, constipation.** These conditions are nearly always due to errors of diet, and the nature and correction of these errors have already been discussed.

Colic. Treatment. The general dietetic treatment has been given. To stop the pain, put hot flannels on the baby's abdomen. See that the child is warm, for cold feet and too light bed clothing may give the baby colic. A good drug for colic is sodium bicarbonate gr. ij, added to a grey powder, night and morning. If the colic persists, give the child a dose of castor-oil, and limit the amount of food it is having, and give it teaspoonfuls of hot water between meals. Dill water and five drops of sweet spirits of nitre are useful household remedies.

Vomiting. Treatment. By lessening the amount of food, or decreasing the fat or sugar, you can often stop vomiting. Lime-water and sodium bicarbonate are useful as gastric sedatives.

Vomiting, which you cannot stop in other ways, can often be relieved by washing out the stomach. You do it in the same manner as described on p. 416, using a No. 10 soft catheter as a stomach tube, and about an ounce of water for every month of the child's age up to six months.

Diarrhoea.

Looseness of the bowels can usually be stopped by decreasing the amount of food for a few meals and giving a dose of castor-oil. You should then endeavour to discover the ingre-

dient that gives the baby looseness of the bowels, and remove or lessen it.

Green stools. Diarrhoea of a more definite nature nearly always results in *green stools*, and frequently the buttocks are excoriated and red. Vomiting frequently accompanies the diarrhoea. It is because of the association of these two— red buttocks and green stools—that you should always look at the napkins of the child and examine the buttocks. Thrush also often accompanies the diarrhoea.

Treatment of green stools. Your treatment is first directed to the cause, and you will frequently find as a cause cracked nipples, in a breast-fed baby; or a dirty bottle, in a bottle-fed baby. You treat the cracked nipple or insist on greater care in the preparation of the baby's food, as the case may be.

First give the baby a teaspoonful of castor-oil. If it is sick, wait for two hours and give it another teaspoonful. Ten to twenty drops of syrup of rhubarb can be given instead of castor-oil. In more severe cases, wash out the bowel with a soft No. 10 catheter and two or three ounces of water. *Washing out the bowel and stomach is nowadays the essential treatment of food poisoning.* Do not hold the funnel more than $1\frac{1}{2}$ to 2 feet above the baby. The intestines are cleansed of their decomposing or irritating contents in this way (see p. 423, Infantile Convulsions). Keep the baby from the breast for twenty-four to forty-eight hours, and give it hot water or albumen water (white of two eggs to the pint of cold water). If bottle fed, give it no cow's milk for two or three days. Hot water and albumen water suffice. Beef juice, made by taking a pound of raw beef, mincing it, soaking it in four ounces of water, and squeezing the product through fine muslin, contains the soluble albumen of meat and is therefore nutritive. The four ounces diluted will suffice for a baby for twenty-four hours. The real difficulty in treatment comes when you have again to give the baby milk. The baby's digestive organs have been upset, and proper treatment consists of a judicious balance between resting the digestive organs and using them for the nutrition of the baby.

In the breast-fed baby, begin by short feeds at four-hourly

intervals, and then short feeds at two-hourly intervals, giving plenty of water or albumen water between meals. Give the baby abundant fresh air and sunlight.

In a bottle-fed baby, begin after twenty-four or forty-eight hours with pepsencia whey, gradually adding sugar and fat, or give dilute peptonized milk. These cases are suitable ones for feeding temporarily with a patent food.

The best drug with which to control any diarrhoea that persists is bismuth. Give the oxycarbonate or subnitrate in twenty grain doses with two grains of tannic acid and four grains of aromatic powder of chalk, three times a day to a child of six months. Give a fourth of the above doses to a baby of a month, and a half to one of three months.

The **red buttocks** are treated by strict cleanliness, removal of the napkins as soon as soiled, and washing the buttocks with cold water. We paint them with picric acid in methylated spirit (saturated solution) once a day, to harden the epithelium. Zinc ointment, thickly spread, keeps the excoriated surfaces from becoming wetted.

Thrush. Thrush is a disease of the mouth that results from a dirty nipple or bottle, or the much treasured, but frequently filthy, comforter, the use of which we strongly condemn. The tongue and cheeks are covered with white patches, which you cannot wipe off with a linen rag. The mouth is dry. Thrush is readily cured by cleansing the mouth after feeds with soft linen and water, and three times a day using glycerine and borax.

Diarrhoea and vomiting of a very acute nature, leading to severe collapse and frequently death of the child, are dealt with in books on general medicine.

Constipation. Treatment. Constipation is common in breast-fed babies, and frequently in no way affects their health. It is less common in bottle-fed babies, and in them is most frequently due to the food being too weak or too little fluid. Sometimes giving teaspoonfuls of hot water will suffice to cure the constipation, and we also give ten drops of cod-liver oil three times a day to babies fed on the breast.

In children of three months the addition of a little Mellin's food to the diet is often effectual.

If a medicine is needed, give either (1) an occasional soap and water enema of two to three ounces injected with a small glass syringe, or (2) ten minims each of syrup of senna and syrup of figs, with ten minims of glycerine and water to the drachm, three or four times a day. Maltine, half a teaspoonful three times a day, is also very valuable.

Get the nurse to massage the baby's abdomen. To do this she lubricates her hand with sweet oil and rubs slowly round and round the baby's abdomen in the direction of the passage of the faeces through the colon. When this is done night and morning, much good often results.

8. **The baby may be kept too hot, in stuffy rooms, and not allowed enough fresh air and exercise.** We have already dealt with the points, and only repeat them here to emphasize their importance.

9. **The baby may have some general disease.**

Marasmus. There are babies that lose weight and die in spite of the different foods and other treatment you try. These children are known as marasmic.

If bottle fed, you should strongly urge the mother to nurse the child or get a wet-nurse.

Salt baths and massage are sometimes good for these babies.

Congenital syphilis. Congenital syphilis may show itself at or shortly after birth. Such babies are wizened and have the 'old man' aspect. Eruptions break out on the body, the most typical being the bullous eruption, which appears especially on the soles and feet, and is known as syphilitic pemphigus. Such babies usually die within a week or two of birth.

More frequently the baby is in excellent health until it is a month old. Snuffles, a macular rash which tends to become the well-known raw ham colour, the syphilitic psoriasis of the soles and palms, fissures around the mouth, acute inflammation, with extreme tenderness of the epiphyses of the long-bones, and malformation of the nails, are the principal signs of syphilis in the early months of babyhood.

The further consideration of congenital syphilis belongs to the physician.

Congenital heart disease. Congenital stenosis of the pylorus. These are both conditions to be remembered when dealing with a baby that is feeble or frequently vomits.

Rickets and scurvy. These diseases may exhibit themselves in children of six months or under, either as the result of bad feeding or the result of chronic gastro-enteritis.

The above diseases are those most likely to affect the progress of the baby, by an interference with its health, not so sudden in itself as immediately to call your attention to the disease. By bearing them in mind you detect them at the outset, and in the case of syphilis, rickets, and scurvy, early recognition is of the greatest importance.

BIRTH INJURIES

Depressed fracture of the skull and facial paralysis. These have been described under injuries from forceps, p. 311.

Fractures. Fractures of the limbs or clavicles sometimes occur as the result of difficult births. The arm may be broken when bringing it down in a difficult breech delivery, the leg in an impacted breech. Treatment of these fractures is carried out on general surgical principles.

Brachial paralysis. Paralysis of the arm is a rare sequel to a difficult labour. Unlike facial paralysis, it frequently remains permanent. On account of this difference Küstner carefully investigated these cases, and came to the conclusion that there had always been some fracture or dislocation of the humerus at the same time. Those cases of birth palsy known as 'Erb's Paralysis', characterized by wasting of the deltoid and pectoral muscles and supinator longus, belong to a different category. Here the lesion would appear to be rupture of the fifth cervical cord ; the symptoms of pronation of the forearm with inability to raise the arm are sufficiently characteristic, and in these cases the treatment of permanent paralysis would be surgical, namely, freeing the nerves, and if necessary reuniting them.

Cephal-haematoma. A cephal-haematoma is an effusion of blood beneath the periosteum of the skull. It does not therefore pass a suture of the skull at the edge of which the

periosteum ends. In this way a cephal-haematoma can be told from a caput succedaneum, the swelling of which is not limited by sutures. Nothing need be done for it, for the blood is absorbed after some time.

Haematoma of the sterno-mastoid. This is by no means a rare sequel. Many think torticollis may follow a haematoma of the sterno-mastoid.

Cerebral haemorrhage. Cerebral haemorrhage may result from a difficult labour. Signs due to it depend on the amount of blood poured out. Convulsions may be followed by death. Some of the cortex may be destroyed, and the various birth palsies, accompanied by spasticity and sometimes by idiocy, are the disastrous consequences.

CONGENITAL MALFORMATIONS

With **tongue-tie, cleft palate, and hare-lip** we have already dealt under Interference with the baby's power of sucking.

Meningocele, encephalocele, spina bifida. The immediate care of these conditions is, cover them with cotton-wool to keep them from friction or injury. For further treatment you should ask the opinion of an operating surgeon.

Club-foot. The proper treatment of club-foot is immediate movement. Six to eight times a day the feet should be pulled into the right position by the nurse from the time of the baby's birth. Further treatment is given in books on surgery; but you should not leave a new-born baby with club-foot, without showing the nurse how to manipulate the feet, and starting the treatment from the day of birth.

Phimosis. Phimosis is treated by pulling back the foreskin a little daily. If it does not fully retract within ten days, the question of circumcision must be considered.

Umbilical or inguinal hernia. These herniae may be aggravated by the straining due to phimosis, in which case you should circumcise the baby.

An umbilical protrusion may usually be cured by folding the skin over the protrusion by means of a strip of plaster or strapping, or keeping a penny over the hernia by strapping. The treatment of inguinal hernia belongs to general surgery.

Imperforate anus. If there is only a thin partition this can be divided.

When there is no proper anus the operation consists in making a vertical incision with a knife in the middle line where the anus should be. If the bowel is not exposed, the incision must be deepened, cutting as close to the sacrum as possible to avoid the peritoneum. When the bowel is seen bulging down, open it carefully by puncture. Do not pull the bowel down, but pass the little finger or a bougie daily to prevent the incision closing. Be very careful to stop all haemorrhage after this operation. Infants are apt to die from quite a small loss of blood.

DISEASES THAT APPEAR SHORTLY AFTER THE BIRTH
OF THE CHILD

Congenital syphilis and thrush. These have been described.

Mastitis. The breast-glands of both male and female sometimes secrete milk after birth. If let alone this will cease spontaneously. If interfered with by the nurse an abscess may form.

Treatment. Protect the breast with pads of wool. If an abscess forms, open it in the usual way.

Red gum or strophulus. Red gum consists of little red pimples crowned by a vesicle or yellow crust, which break out when a baby is too hot or has indigestion. For example, they may be seen on a baby's cheek that has been resting against the breast of the mother, whilst the baby slept.

Treatment. Keep the baby cooler and use a dusting powder. Attend to its digestion.

Jaundice. Slight jaundice is common about the third day of infant life, and can be let alone or cured by two or three grains of phosphate of soda.

More severe and deeper jaundice is due to some congenital disease of the liver or stenosis of the bile duct, and ends fatally.

Jaundice may also be a feature of umbilical sepsis, when it is of quite secondary importance.

Sepsis of the umbilical cord. In spite of every care in dressing, the umbilical cord may become infected by pyogenic organisms, but the greater the care the less is the risk.

Two conditions may result. The first is a phlegmonous inflammation of the abdominal wall about the umbilicus, the second is a general septicaemia. Frequently the two occur together. All the signs common to septicaemia occur. Thus the baby is exceedingly ill, petechiae and jaundice appear, the cord may begin to bleed, the pulse is very rapid, and death supervenes.

Treatment. In the general septicaemic form nothing can be done. When there is a local phlegmonous inflammation, it should be treated like cellulitis elsewhere, by incisions and fomentations. You should remove the baby from the mother, for the virulent germs that are killing the baby may give the mother some puerperal infection and kill her too.

Haemorrhage from the cord. Haemorrhage from the cord, unless due to looseness of the initial ligature, is a very serious sign. The haemorrhage is either due to sepsis, or haemophilia, and in either case will probably lead to a fatal result. Subcutaneous haemorrhages and melaena may accompany it.

Treatment. Put another ligature on the cord closer to the umbilicus. This usually fails to stop the haemorrhage. Your next method is to underpin the umbilical vessels. Pick up the umbilicus and pass a long needle under it from side to side. Now wind a piece of sterile silk in a figure of eight about the needle and so compress the umbilical vessels. We have several times stopped bleeding successfully by this plan.

Melaena. The baby may swallow blood sucked from a cracked nipple and pass it per rectum. More frequently it vomits such swallowed blood. Duodenal ulcer and intussusception have been found in babies a few days old. True melaena is due to a haemophilic condition and is a serious condition. It is sometimes associated with subcutaneous haemorrhage and bleeding from the cord, and is frequently fatal.

Treatment. First examine for cracked nipples.

In the dangerous cases give no food until the bleeding has stopped for twenty-four hours. Give water by the mouth.

We have given calcium chloride gr. v, with adrenalin chloride one minim every four hours, and in one case the bleeding stopped and did not recur. If it seems successful, continue it three times a day until there has been no bleeding for a week.

INFANTILE CONVULSIONS

Causes. The nerve centres in infancy and childhood are always in a comparatively unstable condition, and are apt to manifest this instability by convulsive storms. Thus the processes of early dentition, or the onset of the acute infective fevers, such as scarlatina and measles may be associated with convulsions.

Very young children may develop convulsions as a result of brain lesions inflicted at the time of birth; or they may arise from lesions of which the origin is obscure. Hereditary syphilis, too, may occasion them, and it is probable that true epilepsy develops at an early period of infancy.

To make an accurate diagnosis of the underlying cause is often a matter of extreme difficulty, and many of the diseases associated with convulsions do not fall within the province of the obstetrician.

A cause of convulsions much more common than any of the above will be found in the digestive disturbances of infancy, and to these we desire to call special attention.

Few children brought up by the bottle fail to develop green stools during some portion of the period of bottle feeding. These green stools are not infrequently connected with convulsions. They occur with diarrhoea, which is sometimes very severe, but are occasionally seen with constipation. They arise, too, as a sequel of gastric disturbance, or of thrush. This green pigmentation is due to germ invasion, and the stools in which it is found are apt to be very toxic.

We have frequently noted that the occurrence of convulsions has followed misdirected efforts to arrest green diarrhoea. They have also seemed to us to follow excessive abstraction of fluids from the infant's body, in cases where severe vomiting and diarrhoea coexist.

Given a child in convulsions, who at the same time has been suffering for some days from green stools, vomiting, and diarrhoea, with red buttocks and evidence of thrush, with a depressed fontanelle, pale sunken cheeks and eyes, the probability that convulsions have arisen from these associated conditions will be strong, and treatment which does not take this morbid state into consideration will be of no avail.

Treatment. The above diseases have already been fully dealt with, but we would again emphasize the point that castor-oil in full doses should be at once administered.

Float a drachm and a half of castor-oil on the top of a wineglassful of hot water. From the water it is readily skimmed, and can be administered easily to the baby.

All other available methods to effect elimination of toxins should be adopted, these will include enemas of soap and water, or plain salt and water. From two to three ounces of fluid may with safety be injected into an infant's rectum, a larger quantity is unnecessary and has been known to cause rupture of the bowel. If you have any suspicion that the stomach contains indigestible matter it should be promptly washed out with saline solution, and through the tube used for this purpose the oil can be conveniently poured. If the child's system requires fluid this can be given by the mouth, per rectum, or by intercellular saline injections. We have employed all three methods with satisfactory results.

Whilst these remedies are being prepared the child should be placed in a hot bath to which a teaspoonful of mustard has been added. A handkerchief wrung out in cold water and laid on the head whilst the child is still in the hot bath is a mode of treatment which some have found efficacious.

We have anaesthetized with chloroform as a temporary expedient, but cannot say that we have ever observed benefit to result from the treatment, and confess ourselves prejudiced against it.

Where a rapid amelioration of symptoms seems urgently called for, give morphia. One minim of liq. morphia may be given every half-hour for three doses if symptoms continue, or better still half this dose may be given hypo-

dermically and repeated every half hour whilst necessary. The following is a good sedative mixture, which can be administered when the acutest symptoms have subsided.

Sodium bromide	.	.	.	gr. 24.
Chloral hydrate	.	.	.	gr. 12.
Tinct. belladonnae	.	.	.	꩜ 12.
Glycerine .	.	.	.	.	℥ ss.
Water	.	.	.	.	. ad ℥1ss. Ft. Mis.

Such a mixture may be given in drachm doses every hour whilst the patient is awake and the convulsions continue, and from two to three times a day so long as the child shows from its twitching muscles that it still has a tendency towards convulsions.

Do not lose sight of your patient until normal digestion has been established.

OPHTHALMIA NEONATORUM

Infection. The eyes of infants and very young children are apt to become infected and develop an acute conjunctivitis. The infection is frequently (but not invariably) due to gonorrhoea, the germs of which become inoculated during the child's progress through the parturient canal. When infection thus arises, the disease is seen to develop on the second or third day after birth.

Danger. An increased knowledge amongst doctors and nurses has happily rendered the disease rare, but it still remains the affection of all others that swells the ranks of the class of unfortunate beings who are commonly stated to have been 'born blind', or who have been 'blind from birth'. It must also be noted that destruction or injury of the eye may follow treatment carried out on the most approved principles, and the obstetrician should never hesitate when possible to resign the case to the care of a skilled ophthalmologist, who may be depended upon to have at his command a resourcefulness and skill in the treatment of such cases beyond that of the obstetrician. It frequently happens, however, that such skilled help is not available, and for those who find themselves in this position our remarks are applicable.

The prognosis is usually good, if treatment is begun early and thoroughly executed.

Course and signs. It is not uncommon to see the disease starting in one eye, but quite the exception to find it so localized for many days; as a rule both eyes are soon involved.

The conjunctiva becomes red and injected and soon pours out pus. Owing to the swelling of the lids and the spasm of the orbicularis the pus gets pent back in the eye. When you open the eyelids the pus wells out. Sometimes so great is the tension, that when you open the lids the pus squirts out. Later, ulcer of the cornea may occur, with the result that the eye is entirely destroyed. Permanent haziness of the cornea may result.

Since 1904 5,630 women have been delivered in the Rotunda Hospital and 8 children have developed ophthalmia. To this number must be added one, which we personally know to have developed the disease after the mother's discharge from the hospital on the eighth day, we have met with other cases where ophthalmia has apparently resulted from a late infection. It is easy to understand how contaminated wipes, rags, towels, or marine sponges could serve as a medium for the conveyance of infection.

Prophylaxis. We find it impossible to doubt that the small number of cases seen has been entirely owing to the fact that Credé's prophylactic treatment, i. e. the dropping of a 1 per cent. silver nitrate solution into the eyes of the infant immediately after birth, has been adopted by us as a routine measure. Where this prophylactic has seemed to fail we believe it to be due to the fact of the solution never having reached the eye. More than once we have noticed nervous probationer nurses failing to get the infant's eyelids properly opened while performing this operation, and we suggest the following as a ready method of ensuring success.

Place the infant on the nurse's lap with face looking towards the ceiling, pour a little pool of the solution into the hollow between nose and eye, then whilst this pool is in situ let the lower and upper eyelids be pulled apart by the thumbs of the nurse. The inexperienced have expressed fears lest the eye

be injured by an excess of the silver solution, but such fears may be dismissed as groundless.

Our prophylaxis, moreover, extends further than this, for we make it a rule to douche out the vagina with a solution of cyllin during the second stage of labour in all women who are found to be suffering from purulent discharges. The infant's eyes are also wiped with clean linen rags or moist cotton-wool immediately after birth. Wipe from the outer canthus towards the nose, for in this way the eye is more likely to be efficiently cleansed.

Treatment.

The sound eye. In the event of the disease developing in one eye, every effort should be made to guard the other from infection. Attention will therefore be directed in the first instance to the sound eye. The baby is placed on the side which corresponds to the diseased eye, and the sound eye is wiped with pledgets of cotton-wool soaked in warm boric lotion in a direction moving towards the nose. The same pledget should never wipe the eye twice.

A 1 per cent. solution of nitrate of silver should then be dropped into the eye, and this process repeated night and morning so long as the infant shows a trace of infective inflammation.

The eye should now be covered in a very thorough manner with numerous small pledgets of cotton-wool soaked in boric lotion. Over this protective tissue is placed, and the whole kept in position by long strips of soap plaster.

The diseased eye. Having by this means secured the sound eye from possible contamination, the nurse now proceeds to treat the inflamed one. She should wash it with the boric solution wipes, wiping in a direction opposite to that of the sound eye, namely, the wipes should be moved from the nose towards the outer canthus, the infant remaining as before lying on the side of the bad eye. In this way fear of splashing in the direction of the sound eye is avoided. She should not rest satisfied with the wiping of the outside, but the lids must be carefully opened to permit the lotion to gain entrance to the conjunctiva. The conjunctiva is greatly swollen, and the nurse has often to call to her assistance the help of

another person before the cornea can be seen and irrigated by squeezing the lotion from the wipe. The baby is best held on the lap of the nurse with its face looking towards the ceiling and body slightly inclined towards the diseased side.

If such bathing can be carried out every hour during the day and every two hours during the night so much the better, and in addition to this a 2 per cent. solution of nitrate of silver should be dropped in night and morning during the height of the disease, and less frequently, or else a weaker solution substituted, when the inflammation shows signs of abatement.

During the height of the disease cold wet compresses tend to subdue inflammation, but they had better be discontinued when the disease becomes sub-acute.

The infective nature of the pus is a very definite danger. You must warn all concerned of the danger of getting the pus into the eyes. Thus when you yourself or the nurse open the baby's eyelids keep the face away, else the pus may squirt into the eye. The hands, after dealing with the child, must be carefully washed, and all wool or linen used for the child's eyes must be burned.

APPENDIX

Statistics taken from the last three Annual Reports

STATISTICS, 1903–1904

TABLE No. I.—*Admissions to Maternity Department.*

—	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
Total deliveries .	124	141	148	122	149	149	197	161	176	168	143	150	1,827
Total abortions .	5	3	6	8	3	10	6	1	4	5	4	4	60
Not in labour .	21	31	20	28	24	28	36	17	36	29	21	19	310
Total	150	175	174	158	176	187	239	179	216	202	168	173	2,197

TABLE No. II.—*Showing Nature and Number of Cases Treated in the Extern Maternity, 1903–1904.*

Total deliveries . . . 2,285	Mortality, maternal . . 6
Abortions 268	Haemorrhage—
Hydramnios 5	Accidental . . . 7
Presentations—	Unavoidable . . . 7
Face 4	Post-partum . . . 10
Face to pubes . . 14	
Brow 1	Operations—
Breech and footling . 59	Version 14
Transverse and oblique 9	Forceps 39
Compound . . . 2	Decapitation . . . 1
Twins 21	Manual removal of pla-
Prolapse of funis . . 6	centa 24
Infantile conditions—	
Meningocele . . . 1	Eclampsia 2

Extern Maternity Mortality.

Post-partum haemorrhage . . 1
Accidental haemorrhage . . . 3
Pneumonia 1
Rheumatic fever 1
                       6

TABLE No. III.—*Showing Nature and Number of Cases Treated
in Intern Maternity.*

Total admissions . . . 2,197	Eclampsia 8
,, deliveries . . . 1,887	Mania 2
Primiparae 664	Emphysema (cutaneous) . 1
Abortions 60	Puerperal ulcer . . . 7
Hydrorrhoea . . . 1	Morbidity 202
Hyperemesis . . . 1	Mastitis 3
Hydramnios 7	Mortality, infantile—
Myxoma of the chorion . 2	Died in Hospital . . 40
Presentations—	Premature . . . 20
Face 2	Recent 32
Face to pubes . . 19	Macerated . . . 48
Brow 3	Putrid 1
Breech and footling . 56	Mortality, maternal . . 13
Transverse and oblique 5	Infantile conditions—
Compound . . . 2	Anencephalus . . 3
Twins 16	Hydrocephalus . . 5
Prolapse of funis . . 6	Spina bifida . . . 6
Haemorrhage—	Meningocele . . . 2
Accidental . . . 13	Cephalhaematoma . . 1
Unavoidable . . . 4	Cleft palate . . . 2
Post-partum . . . 29	Ophthalmia . . . 2
Secondary . . . 2	Talipes 4
Haematoma vulvae . . 2	Deformed hands . . 3
Lacerated perineum . . 392	Hydrocele and hypo-
Complete tears of the perineum 4	spadias . . . 1
Myoma 3	Ectropion vesicae . . 1
Deformed pelves . . . 4	Imperforate anus . . 4
Operations—	Mastitis 1
Induction of labour . 5	Convulsions . . . 2
Version 9	Icterus 9
Forceps 65	Monsters 1
Perforation . . . 1	
Caesarean section . . 1	
Symphysiotomy . . 1	
Manual removal of pla-	
centa 36	

TABLE No. IV.— *Maternal Mortality.*

Name	Admitted	Delivered	Died	Cause of death	Notes
K. M.	Dec. 30	Dec. 30	Dec. 30	Accidental haemorrhage	Plugging and version
A. I.	Jan. 21	Jan. 22	Jan. 27	Rupture of the vagina	Version, hysterectomy
M. E.	Feb. 17	Feb. 18	March 8	Phthisis	
L. M.	March 6	March 7	April 1	Septicaemia	
M. D.	April 13	April 13	,, 18	Pneumonia	
E. P.	,, 13	,, 13	,, 15	Cardiac failure	Forceps
E. M'E.	,, 16	,, 16	June 9	Pyaemia	
A. S.	,, 23	,, 24	May 5	Septicaemia	Placenta praevia
M. W.	,, 27	,, 27	,, 12	,,	Secondary *post-partum* haemorrhage
A. M.	March 16	March 17	,, 23	Pyaemia	
M. M'D.	May 15	May 15	,, 30	Septicaemia	
S. B.	June 23	June 23	July 27	Pyaemia	
E. G.	Oct. 12	Oct. 12	Oct. 20	Septicaemia	Putrid foetus, 7th month

TABLE No. V.—*Application of Forceps.*

Indication	No.	Dead Children	REMARKS
Delay in 2nd stage, with danger to mother or child	50	2	
Prolapse of cord . .	1	—	
Contracted pelvis .	3	1	In one case the forceps slipped and had to be abandoned. Delivery completed by version. Child was dead.
Occipito-posterior .	7	1	
Eclampsia . .	1	—	Os fully dilated. Head low down.
Cardiac and renal disease	2	1	Applied before the first stage had ended.
Early rupture of membrane	1	—	Applied on account of child before the first stage was completed.
Total . .	65	5	

TABLE No. VI.—*Placenta Praevia.*

Name	Age and Para	Variety	Period	Result to Child	Presentation	REMARKS
1. I. B.	32, VII.	Marginal	Term	A.	Breech	Bleeding slightly for three days; foot brought down; delivered in 16 hours.
2. A. C.	36, V.	,,	8 months	D.	Head	Sent in bleeding; cord prolapsed; pulseless; version; delivery in 1 hour.
3. B. K.	36, VIII.	Central	Term	D.	,,	Version; delivery in 6 hours.
4. A. S.	30, II.	,,	,,	D.	,,	See 'Mortality' Case VIII. Plugged outside. Podalic version; in hospital.

TABLE No. VII.—*Accidental Haemorrhage.*

Name	Age and Para	Date	Variety	Treatment	Result to Child	REMARKS
1. A. C.	37, VIII.	1903 Nov. 8	External	None	Alive	In good labour.
2. M. F.	42, VIII.	,, 21	,,	,,	,,	In labour; membranes had ruptured.
3. K. M.	29, VI	Dec. 30	,,	Plugged and version	Dead	Lost about 1½ pints. No further loss. Patient died.
4. B. G.	35, XIV.	1904 Mar. 22	,,	None	,,	In labour.
5. M. B.	40, II.	Apl. 26	,,	Plugged	,,	7th month. Plugged before admission. Labour had started.
6. N. C.	29, I.	May 1	Mixed	None	,,	Slight external. 1½ lbs. clots after placenta.
7. M. C.	29, VIII.	,, 5	External	,,	,,	Was in labour.
8. A. W.	23, III.	,, 11	,,	Plugged	Alive	Labour followed soon.
9. M. C.	39, XI.	,, 13	,,	,,	Dead	Hydramnios. Labour followed soon.
10. R. C.	36, VII.	,, 14	,,	Version	,,	Oblique presentation. Delivery in 2 hours.
11 S. D.	34, XIV.	,, 31	,,	None	Alive	Premature. In labour.
12. C. D.	29, VI.	Aug. 2	Mixed	,,	,,	Slight external. Large clots after placenta.
13. R. L.	27, IX.	,, 3	External	Plugged	Dead	Delivery in 20 hours.

TABLE No. VIII.—*Cases of Contracted Pelvis.*

Name	Age	Para	Pelvic Measurements					Mode of Delivery	Result to Child	Remarks
			C.V.	Trans.	Ext. C.	I.C.	I.S.			
M. G.	20	I.	8	13	—	—	—	—	Dead	Symphysiotomy.
M. H.	23	I.	8	13	15	28	24	—	Alive	Caesarean section.
H. H.	24	I.	8	13	17	—	24	Forceps	Alive	Coxalgia.
M. M.	32	VII.	9½	13	—	—	—	Version	Dead	Induced labour.

TABLE No. IX.—A. *Morbidity.*

Temperature	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
100.8° to 101.2°	3	4	3	3	5	4	5	6	1	–	1	2	37
101.2° to 102.2°	–	1	4	8	4	4	4	3	5	2	2	1	38
102.2° to 104°	1	1	4	2	10	7	6	5	5	8	5	4	58
104° and above	–	–	–	–	7	4	3	5	2	4	–	1	26
Total	4	6	11	13	26	19	18	19	13	14	8	8	159
Percentage													8.42

TABLE No. IX.—B.

Temperature	Nov.	Dec.	Jan.	Feb.	March	April	May	June'	July	Aug.	Sept.	Oct.	Total
99°, P. 90	9	11	13	14	28	19	26	20	19	18	15	10	202
Percentage													10.70

TABLE No. IX.—C.

Causes of Morbidity other than Uterine.

Breast abscesses	8
,, inflamed	8
Cardiac disease	1
Bronchitis	2
Constipation	12
Eclampsia	5
Influenza	6
Mania	1
Phthisis	1
Pneumonia	1
Pleurisy	1
Renal disease	6
Puerperal ulcer	7
Lacerated vagina	4
Total ...	58

TABLE No. IX.—D.

Day of occurrences of Temp.				Day of occurrences of Temp.			
1st	26		6th	18
2nd	36		7th	11
3rd	36		8th	14
4th	31		9th	5
5th	26		10th, &c.	2

STATISTICS, 1904–1905

TABLE No. I.—*Maternity Department.*

—	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
Total deliveries .	144	132	153	146	169	159	181	147	161	154	172	147	1,865
Total abortions .	2	1	4	1	—	7	5	2	5	2	4	6	39
Not in labour .	19	26	19	31	29	28	39	35	33	24	27	27	337
Total	165	159	176	178	198	194	225	184	199	180	203	180	2,241

TABLE No. II.—*Showing Nature and Number of Cases in Extern Maternity.*

Total deliveries . . . 2,178	Haemorrhage—(*continued*)—
	Unavoidable . . . 11
Abortions 272	Post-partum . . . 20
Presentations—	„ „ secondary . 1
Face 6	Operations—
Face to pubis . . 21	Forceps 32
Brow 1	Versions . . . 16
Breech and footling . 69	Manual removal of pla-
Transverse and oblique 9	centa 34
Compound . . . 5	Catheterization for hy-
Corpore conduplicato . 1	drocephaly . . . 1
Twins 25	Maternal mortality . . 8
Prolapse of funis . . 6	Infantile conditions—
Hydramnios . . . 3	Congenital intestinal
Mania 1	obstruction . . 1
Phlegmasia 2	Spina bifida . . . 1
Complete laceration of peri-	Hydrocephalus . . 3
neum 3	Anencephalus . . 1
Haemorrhage—	Meningocele . . 1
Accidental . . . 2	Talipes 3

Extern Maternity Mortality.

Septicaemia 4
Post-partum haemorrhage . . . 2
Ante-partum haemorrhage . . . 1
Supposed embolism 1
                          8

TABLE No. III.—*Showing Nature and Number of Cases Treated in Intern Maternity.*

Total admissions . . . 2,241	Pneumonia 2
,, deliveries . . . 1,904	Eclampsia 12
Abortions 39	Mania 2
Primiparae 700	Puerperal ulcer . . . 8
Hyperemesis . . . 2	Mastitis 2
Hydramnios . . . 8	Spontaneous inversion of
Presentations—	uterus . . . 1
Face 2	Rupture of uterus . . 1
Face to pubis . . 12	Haematoma vulvae . . 1
Brow 2	Morbidity (100·8°-T. and
Breech and footling . 51	over) 134
Transverse and oblique . 6	Morbidity (Rotunda estima-
Compound . . . 2	tion) 127
Twins 32	Mortality, maternal . . 6
Prolapse of funis . . . 11	Mortality, infantile—
Haemorrhage—	Died in Hospital . . 34
Accidental . . . 8	Premature . . . 18
Unavoidable . . . 3	Recent 39
Post-partum . . . 19	Macerated . . . 52
Secondary . . . —	Infantile conditions—
Lacerated perineum, incom-	Anencephalus . . 3
plete 455	Hydrocephalus . . 1
Lacerated perineum, com-	Spina bifida . . . 2
plete 4	Congenital umbilical
Myoma of uterus . . . 6	hernia . . . 1
Deformed pelves . . . 12	Subcuticular ecchymosis 1
Atresia of vagina . . . 1	Ophthalmia . . . 2
Operations—	Talipes 4
Induction of labour . 3	Deformed hands . . 1
Version 10	,, feet . . 1
Forceps 82	Icterus 8
Caesarean section . . 4	Cleft palate . . . 2
Manual removal of pla-	Mastitis . . . 2
centa 26	Foetus papyraceous . . 1
	Born in asphyxia pallida . 7

TABLE No. IV.—*Accidental Haemorrhage.*

Name	Age and Para	Date	Variety	Treatment	Result to Child	REMARKS
M. McA.	34, XI.	1904 Nov. 15	Concealed	None	Dead	3¼ lb. of clots followed birth of child.
M. B.	41, XI.	,, 25	Mixed	Plugged	Dead; macerated	Concealed at first, then became external four hours before delivery. Premature child.

Table No. IV.—*Continued.*

Name	Age and Para	Date	Variety	Treatment	Result to Child	Remarks
A. K.	18, I.	1904 Dec. 26	Mixed	None	Alive	In labour. Clots before and after delivery.
C. P.	28, II.	1905 Jan. 21	External	Plugged	,,	In labour.
K. S.	35, X.	Mar. 24	,,	,,	,,	Not in labour. Labour was not induced by plugging. Kept in bed as haemorrhage recurred when she got up. Delivered herself April 8th.
C. O'N.	30, VII.	Apr. 29	,,	Tight binder	,,	Hot vaginal douche. In labour.
B. C.	22, I.	Sept. 6	,,	Plugged	Dead; macerated	In labour.
E. G.	24, I.	Nov. 14	,,	Forceps	Alive	In labour. Haemorrhage started during second stage; occipito-posterior. *Vide* ' Forceps '.

Table No. V.—*Placenta Praevia.*

Name	Age and Para	Variety	Period	Result to Child	Presentation	Remarks
A. P.	28, IV.	Lateral	Term	D.	Vertex	Bleeding a fortnight irregularly; version; delivery in one hour.
P. C.	38, V.	,,	,,	A.	,,	Placenta could be felt, but after admission there was no haemorrhage; delivery in five hours.
N. U.	28, V.	,,	8 months	D.	,,	Version; delivery in three hours.

TABLE No. VI.—*Cases of Contracted Pelvis.*

Name	Age	Para	Pelvic Measurements					Mode of Delivery	Result to Child	REMARKS
			C. V.	Trans.	Ext. C.	I-C.	I.S.			
S. F.	33	II.	7	11½	20	27	28	Spontaneous	Alive	Labour induced.
A. O'R.	29	I.	5⅝	11	17	24⅞	25	Caesarean section	Alive	
J. B.	34	IV.	6⅔	10⅔	—	25½	25⅓	Caesarean section	Alive	
M. T.	28	II.	7½	10	17	24	24	Forceps	Dead	
M. F.	26	I.	6	—	15½	27	27	Caesarean section	Dead	
E. C.	41	XI.	8	11½	18	28	30	Spontaneous	Alive	Labour induced.
A. O'C.	36	I.	8½	—	18½	28	28	Forceps	Alive	Head above brim.
E. S.	36	IV.	9¾	—	18	27	24	Version	Alive	
E. F.	38	III.	8½	10	17½	27½	25	Forceps	Alive	Other deliveries, induced labour. This was full term.
A. P.	23	II.	7⅞	—	16½	28½	27	Caesarean section	Alive	Caesarean section, second time.
B. M.	33	I.	7¼	11¾	17	27	25	Version	Dead	Face presentation.
M. C.	36	II.	9	—	—	—	—	Version	Alive	Prolapse of cord.

TABLE No. VII.—*Application of Forceps.*

Indication	No.	Dead Children	REMARKS
Delay in second stage, with danger to mother or child	66	3	One of the children was macerated.
Prolapse of cord . .	2	—	
Contracted pelvis . .	3	1	*Vide* Contracted pelvis table, M. T.
Occipito-posterior . .	7	2	*Vide* Ruptured uterus, one case. In another, patient 48 hours in labour. Os size of sixpence, dilated by Frommer.
Eclampsia . . .	2	—	Os fully dilated. Head low down.
Cardiac and pulmonary disease	1	—	Patient in great distress In second stage ; pulse 120. Respirations 65. Cyanosis and orthopnoea.
Fibroid uterus . .	1	—	Large fibroid on right side of lower uterine segment. Pains very weak.
Total . . .	82	6	

TABLE No. VIII. A.— *Morbidity* 100·8° *and over.*

Temperature	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
100·8° to 101·2°	1	6	4	3	3	1	1	2	7	3	2	3	36
101·2° to 102·2°	6	2	3	5	2	8	5	–	3	2	7	6	49
102·2° to 104°	3	6	4	1	4	2	4	3	2	6	3	6	44
104° and over	–	–	–	2	–	–	–	1	–	–	1	1	5
Total	10	14	11	11	9	11	10	6	12	11	13	16	134
Percentage													7·03

TABLE No. VIII. B.—*Temperature and Pulse over 99° and 90.*

	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Temp. and pulse over 99° and 90	10	12	8	6	13	10	12	16	8	11	11	10	127
Percentage													6·67

TABLE No. VIII. C.—*Comparison of Morbidities.*

	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
No. of cases in which both morbidities existed	7	10	6	4	5	5	8	5	2	7	9	10	78
No. of cases of 100·8° T. only	3	4	5	7	4	6	2	1	10	4	4	6	56
No. of cases of 99° T. and 90 P. only	3	2	2	2	8	5	4	11	6	4	2	–	49

For standard of morbidity, as recommended by the British Medical Association, see general remarks on Morbidity.

TABLE No. VIII. D.—*Day of occurrence of Temperature 100·8° and over.*

Day	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
1st	—	1	—	—	1	1	2	—	2	1	2	3	13
2nd	1	2	—	—	4	1	—	1	2	2	1	2	16
3rd	1	4	2	—	—	3	—	3	4	3	4	3	27
4th	1	—	4	5	1	4	1	—	3	2	2	3	26
5th	1	1	1	1	2	—	2	—	—	1	1	2	12
6th	1	3	—	—	1	1	2	1	—	—	1	—	10
7th	1	1	2	3	—	1	—	1	—	—	1	2	12
8th	3	—	1	—	—	—	3	—	1	1	—	—	9
9th	1	—	1	—	—	—	—	—	—	1	1	—	4
10th, &c.	—	2	—	2	—	—	—	—	—	—	—	1	5
Total	10	14	11	11	9	11	10	6	12	11	13	16	134

TABLE No. VIII. E.—*Day of occurrence of Temperature and Pulse over 99° and 90.*

Day	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
1st	—	1	—	—	1	2	2	4	2	—	2	1	15
2nd	4	4	1	—	1	—	—	2	1	3	3	3	22
3rd	—	3	—	3	6	4	—	4	2	2	4	2	30
4th	2	1	2	—	1	3	3	4	2	2	—	1	21
5th	1	—	2	—	2	—	1	—	1	2	—	—	9
6th	1	1	1	—	1	—	1	1	—	2	2	—	10
7th	—	1	2	1	1	1	2	—	—	—	—	2	10
8th	1	—	—	1	—	—	3	1	—	—	—	1	7
9th	1	—	—	—	—	—	—	—	—	—	—	—	1
10th, &c.	—	1	—	1	—	—	—	—	—	—	—	—	2
Total	10	12	8	6	13	10	12	16	8	11	11	10	127

TABLE No. VIII. F.—*Causes of Morbidity other than Uterine.*

Breast abscesses	2
„ inflamed	3
Bronchitis	1
Constipation	10
Eclampsia	2
Influenza	6
Phthisis	1
Pneumonia	1
Renal disease	2
Puerperal ulcer	5
Impetigo	2
Phlegmasia alba dolens	1
Cystitis	1
Venous thrombosis	2
Gum-boil and swelled face	1
Total	40

TABLE No. IX.—*Maternal Mortality.*

Name	Admitted	Delivered	Died	Cause of death	Notes
M. C.	Nov. 11	Nov. 11	Nov. 14	Eclampsia	Post-partum
M. K.	May 24	May 25	May 25	Rupture of uterus	Rent plugged
M. K.	May 25	May 26	May 26	Eclampsia	—
S. O'K.	June 30	June 30	July 8	Septicaemia	Pan-hysterectomy
A. D.	Sept. 18	Sept. 18	Sept. 26	Pneumonia	—
M. C.	Oct. 19	Oct. 20	Oct. 27	Septicaemia	—

STATISTICS, 1905–6

TABLE No. I.—*Maternity Department.*

—	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
Total deliveries	131	149	150	138	157	145	178	150	163	160	167	150	1,838
Total abortions	4	5	9	1	3	2	3	6	7	12	8	6	66
Not in labour	22	27	21	17	29	17	37	25	27	52	52	32	358
Total	157	181	180	156	189	164	218	181	197	224	227	188	2,262

TABLE No. II.—*Showing Nature and Number of Cases in Extern Maternity.*

Total deliveries . . . 2,254	Hydramnios 7
Abortions 287	Prolapse of uterus . . 1
Presentations—	,, ,, funis . . . 5
Face 5	Retroverted incarcerated
Face to pubis . . . 13	uterus 1
Brow 4	Rupture of uterus . . . 2
Breech and footling . 77	Fibroid uterus . . . 5
Transverse and oblique . 15	Complete laceration of peri-
Compound . . . 1	neum 1
Twins 41	Mastitis 5
Haemorrhage—	Phlegmasia 4
Accidental . . . 10	Maternal mortality . . 11
Unavoidable . . . 15	Infantile conditions—
Post-partum . . . 29	Spina bifida . . . 1
,, ,, secondary . 1	Hydrocephaly . . 5
,, ,, traumatic . 1	Meningocele . . . 1
Operations—	Talipes 4
Forceps 42	Intra-uterine amputation of
Versions . . . 29	arm 1
Manual removal of pla-	Congenital Oedema . . 1
centa 19	Maldevelopment of jaw . 1
Perforation . . . 2	Opthalmia 2
Hydatidiform mole . . 1	Pemphigus 1
Carneous ,, . . 1	

Extern Mortality.

Septicaemia 4
Ante-partum haemorrhage 2
Placenta praevia 1
Post-partum haemorrhage 1
Acute Nephritis without fits 1
Embolism 1
Ruptured uterus 1

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TABLE No. III.—*Showing Nature and Number of Cases Treated in Intern Maternity.*

Total admissions . . .	2,262	Eclampsia	8
,, deliveries . . .	1,904	Mania	3
Abortions	66	Pneumonia	1
Hydatidiform mole . .	1	Typhoid	1
Primiparae	700	Urticaria herpetiformis .	1
Presentations—		Epilepsy	2
Face	4	Morbidity (B.M.A., suggested	
Face to pubis . . .	8	estimate)	—
Brow	5	Morbidity (Rotunda estimate)	—
Breech and footling .	35	Maternal mortality . .	8
Transverse and oblique .	2	Infantile mortality—	
Compound . . .	1	Died in Hospital . .	30
Twins	23	Premature . . .	20
Prolapse of funis . . .	10	Recent	30
Lacerated perineum, incom-		Macerated . . .	41
plete	490	Infantile conditions—	
Lacerated perineum, com-		Anencephalus . .	3
plete	—	Spina bifida . . .	2
Hyperemesis. . . .	3	Ophthalmia . . .	4
Hydramnios	6	Melaena	3
Myoma of uterus . . .	4	Cleft palate . . .	2
Hernia of gravid uterus .	1	Hare-lip	1
Deformed pelves . . .	13	Imperforate anus . .	1
Haemorrhage—		Absence of radius and	
Accidental . . .	6	thumbs . . .	1
Unavoidable . . .	6	Talipes	5
Post-partum . . .	16	Spontaneous facial para-	
,, ,, secondary .	1	lysis	1
Operations—		Traumatic paralysis of	
Forceps	51	arm	1
Version	11	Secondary haemorrhage	
Induction of labour .	11	from cord . . .	1
Caesarean section . .	1	Intussusception . .	1
Manual removal of pla-		Haemorrhage into ant.	
centa	20	chamber of eye . .	1
Phlegmasia alba dolens .	3	Capillary naevus . .	1
Puerperal ulcer . .	2	Webbed fingers . .	1
Mastitis	4	Convulsions . . .	1
Galactocele . . .	1		

TABLE No. IV.—*Accidental Haemorrhage.*

Name	Age and Para	Date	Variety	Treatment	Result to Child	REMARKS
M. G.	39, IX.	1905 Dec. 7	Mixed	Tight binder	Alive	Spontaneous delivery. Child followed at once by placenta and clots.
K. C.	41, VII.	1906 Feb. 3	External	Forceps	Dead	Full - term child. Bleeding for two days previously. Patient in labour.
S. M.	21, I.	May 21	,,	Plugged	,,	8 months' child. Delivery followed plugging 3¼ hours. Adherent placenta. Manual removal.
A. L.	26, III.	July 1	,,	Rupture of membranes	,,	Patient in strong labour. Free haemorrhage. Membranes tough and very protruding.
M. R.	24, III.	,, 15	,,	Tight binder and forceps	,,	Patient admitted blanched and with air-hunger. Full term.
M. E. M.	35, XI.	Aug. 8	Concealed	Plugged and tight binder	,,	Vide mortality table (Maternal), No. 6.

TABLE No. V.—*Placenta Praevia.*

Name	Age and Para	Variety	Period	Result to Child	Presentation	REMARKS
M. K.	37, K.	Marginal	8th month	D.	Vertex	Version. Delivery in 19 mins.
M. M.	25, II.	Central	Term	,,	,,	Version. Irregular haemorrhage for four weeks.
E. C.	40, II.	,,	,,	,,	,,	Version. *Vide* mortality (maternal) No. 2.
J. C.	32, V.	Marginal	8th month	A.	,,	Patient in strong labour. Portion of placenta in vagina. Nothing done.
L. G.	23, II.	Lateral ?	Term	D.	,,	Portion of placenta in front of head at birth. In strong labour. Nothing done.
M. M.	23, I.	Central	7th month	A.	,,	Admitted plugged; the plugs removed; no haemorrhage. Version performed. Delivery in five hours. Placenta battledore.

TABLE No. VI.—*Contracted Pelves.*

Name	Age	Para	Pelvic Measurements					Mode of Delivery	Result to Child	REMARKS
			C. V.	Trans.	Ext. C.	I.C.	I.S.			
M. H.	30	II.	8	13	15	28	25	Caesarean section	Alive	Second operation.
S. F.	34	III.	7	11.5	20	27	28	Version	Dead	Induction at 36th week; 2nd time.
M. K.	43	XI.	6	11.5	18	31	29	Spontaneous	Alive	Induction, 37th week; 8th time.
M. G.	22	II.	8	13	—	—	—	,,	,,	Symphysiotomy performed previously.
E. K.	27	III.	9	11.5	18.5	29	27	Forceps	Dead	Induction, 39th week; 3rd induction.
M. W.	27	II.	7.2	—	18	28	26	Spontaneous	Alive	Labour prolonged for 20 hours; previous confinement normal.
S. M.	23	III.	7.2	13	18	31	31	Version	Dead	Labour induced, 37th week; head did not fix, so podalic version was done.
T. M.	28	III.	7	12	17	27	27	Spontaneous	,,	Induction, 28th week; breach presentation. Previous labours, 1st term, forceps; 2nd term, version.
J. F.	24	III.	7.7	11.2	20.5	28	27	Expression	Alive	Induction, 38th week; prolapse of cord. Previous labours, term, forceps; both children dead.
M. P.	16	I.	8	11.5	19	25	25	Spontaneous	,,	Face presentation.
L. K.	21	I.	6.8	—	15.5	26	24.5	Forceps	,,	Prolonged labour; small head, which moulded well.
G. L.	27	I.	7	11	20	27	26.5	Expression	,,	Induction, 32nd week; compound presentation, head and hand. Small child; weight, 4¾ lbs.
M. T.	30	III.	7.5	10	17.5	24	24	Forceps	,,	Term, occipito-posterior. Dorsal curvature.

TABLE No. VII.—*Forceps.*

Indication	No.	Dead Children	REMARKS
Delay in second stage, with danger to mother or child	34	3	One of the children was macerated.
Prolapse of cord	4	—	
Contracted pelvis	3	—	*Vide* Contracted pelvis, Table No. VII.
Occipito-posterior	3	—	
Eclampsia	2	1	Os fully dilated, and head low down in both cases.
Induced labour	1	1	*Vide* E. K., Contracted pelvis, Table No. VII.
Accidental haemorrhage	2	1	*Vide* Accidental haemorrhage, Table No. V., K. C. & B. G.
Face presentation	1	—	
Brow presentation	1	1	Patient admitted from outside with a history of having been 68 hours in labour.
Total	51	7	

TABLE No. VIII. A.—*Morbidity.*

Estimation proposed by British Medical Association.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Temp., of 100° or over, counting from the end of first 24 hours of the puerperium to 8th day, inclusive.	4.44	5.19	8.17	10.79	11.87	8.84	6.62	14.10	8.23	8.13	4.57	10.25	
					Total percentage . .								8.43

TABLE No. VIII. B.—*Morbidity.*

Rotunda Estimation.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Temp. and pulse over 99° and 90 for three consecutive takings.	2.22	3.25	5.72	3.52	5.00	6.80	6.07	5.76	4.11	4.06	1.71	3.84	
					Total . .								4.33

TABLE No. VIII. C.—*Morbidity.*

	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Percentage of cases in which both estimations existed.	2.22	2.59	5 03	3.52	3.75	6.80	4.41	5.76	3.52	3.90	1.71	3.84	3.92

TABLE No. VIII. D.—*Comparison of Morbidities.*

PRIMIPARA.

	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Percentage of morbidity occurring with primiparae.	3.92	12.19	18.96	17.54	22.40	14.03	13.88	26.53	16.39	13.33	6.55	18.03	15.31

MULTIPARA.

	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Percentage of morbidity occurring with X-para.	4.76	3.53	2.97	6.09	7.84	5.55	3.66	9.34	4.49	6.18	2.63	5.26	5.19

TABLE No. VIII. E.—*Causes of Morbidity other than Uterine.*

Breast abscess	2
,, inflamed	2
Constipation	7
Eclampsia	4
Influenza	5
Pneumonia	1
Puerperal ulcer	3
Haemorrhoids	2
Typhoid	1
Urticaria herpetiformis	1
Phlegmasia alba dolens	3
Alveolar abscess	2
Total	33

Table No. VIII. F.

Number of Lacerated Perineums showing Morbidity for Year.

English estimation 33
Rotunda 10
Both 28
——
Total 71
——

Operative Cases showing Morbidity.

Forceps (English, 3 ; Rotunda, 2 ; both, 8) 13
Manual removals (English, 2 ; Rotunda, 1 ; both, 5) . . 8
Induction of labour (English, 1) 1
Abortion removal (English, 1) 1
Breech (English, 1 ; both, 1) 2
Plugging for P.P.H. (both, 1) 1
——
Total 26
——

Of these morbid operative cases 8 were associated with lacerated perineums.
Total No. of cases delivered 147
No. of 1-paras 57
No. of X-paras 90

April.—Morbidity Cases.

Eng. . . . . = 13 = 8.84 per cent.
R. H. . . . . = 10 = 6.80 ,,
Both . . . . = 10 = 6.80 ,,

Length of Time in Hospital of Morbidity Cases.

Eng.	13	8	13	0	24	11	12	12	13	10	15	18	0
R. H.	13	0	13	12	24	0	12	12	13	10	15	0	8
Both	13	0	13	0	24	0	12	12	13	10	15	0	0

1-paras . . . . = 8 = 14.03 per cent.
X-paras . . . . = 5 = 5.55 ,,

Analytic Study of Cases of Morbidity.

Abbreviations.

L.P. Lacerated perineum.
R.H. Rotunda Hospital's morbidity
│ standard.
V.D. Vaginal douche.

Eng. English morbidity standard.
P.V. Vaginal examination.
I.U.D. Intra-uterine douche.
P.P.H. Post-partum haemorrhage.

1-para—L.P. R.H. 8 days in. Fissured nipple, left breast. V.D. 2 P.V.

1-para—L.P. Eng. 8 days in. Swollen legs and feet; albuminuria ; 4th and 6th, even. (diplococcus found.) V.D. 9th even. I.U.D. Organized blood clot and decidua came away. 1 P.V.

1-para—L.P. Eng. & R.H. 15 days in. Breech; prolonged labour; I.U.D.; 3 times ; membrane and clots got away.

4-para.	Eng. & R.H.		Oedema of right foot and leg; albuminuria 7th evening, rigor. 8th morning—I.U.D. and culture (nothing found); quantity of decidua and blood clot. 8th evening—I.U.D. repeated; more débris; 10 days in. 1 P.V.
1-para.	Eng. & R.H.	30 days in.	Culture; st. albus; large; diplococcus; small bacillus. No P.V.
1-para—L.P.	Eng. & R.H.	12 days in.	Sixth evening—I.U.D.; nothing resulted; culture = 0; erythema; 6th evening. No P.V.
3-para.	Eng. & R.H.	12 days in.	Contracted pelvis (M. T.); occipito-post.; forceps; 3rd evening; I. U. D. = 0 culture = small diplococcus and large bacillus. 1 P.V.
1-para.	Eng. & R.H.	11 days in.	Condylomata ovum expressed whole; 6½ months. No P.V.
3-para.	Eng. & R.H.	24 days in.	P.P.H.; I.U.D.; 4 times; clots and débris, foetid, got away. No P.V.
3-para.	R.H.	12 days in.	Adherent placenta; manual removal; I.U.D. 4 times. 1 P.V.
1-para.	Eng. & R.H.	13 days in.	I.U.D. 4 times; membrane came away; culture + No P.V.
6-para.	Eng.	8 days in.	I.U.D. culture = large diplococcus. 1 P.V.
1-para—L.P.	Eng. & R.H.	12 days in.	I.U.D. 4 times; once foetid. return. No P.V.

Total No. of cases delivered 156
No. of 1-paras 49
No. of X-paras 107

June.—Morbidity Cases.

Eng. . . . . = 22 = 14.10 per cent.
R.H. . . . . = 9 = 5.76 ,,
Both . . . . = 9 = 5.76 ,,

Length of Time in Hospital of Morbidity Cases.

Eng.	8	11	9	14	13	9	11	10	13	13	10	9	8	12	14	8	16	8	8	8	9	15	18
R.H.	0	0	0	0	13	0	0	10	13	13	0	9	0	0	14	0	16	0	0	0	9	15	18
Both	0	0	0	0	13	0	0	10	13	13	0	9	0	0	14	0	16	0	0	0	9	15	18

1-paras . . . . = 13 = 26.53 per cent.
X-paras . . . . = 10 = 9.34 ,,

Analytic Study of Morbidities.

2 para—L.P.	Eng. & R.H.	15 days in.	No P.V. V.D.
1-para.	Eng. & R.H.	9 days in.	Severe haemorrhoids; I.U.D. No P.V.
1-para—L.P.	Eng.	8 days in.	V.O.; retained membranes. No P.V.

11-para.	Eng. & R.H.	16 days in.	Macerated foetus; albuminuric V.D.; I.U.D.; retained membranes. No P.V.
3-para—L.P.	Eng.	8 days in.	I U.D.; fragments and clots came away. No P.V.
7-para.	Eng.	8 days in.	I.U.D. No P.V. Erythematous rash, legs and shoulders.
8-para—L.P.	Eng.	8 days in.	Macerating surfaces on legs; V.D. 1 P.V.
1-para – L.P.	Eng. & R.H.	14 days in.	Albuminuria; swollen legs; twice I.U.D. 1 P.V.
1-para—L.P.	Eng.	12 days in.	I.U.D. 1 P.V.
2-para.	Eng.	8 days in.	V.D. No P.V.
1-para – L.P.	Eng. & R.H.	9 days in.	V.D.; retained membranes. No P.V.
1-para—L.P.	Eng.	10 days in.	Retained membrane came away. No P.V.
1-para—L.P.	Eng. & R.H.	13 days in.	Twice I.U.D.; clots came away. No P.V.
2-para—L.P.	Eng. & R.H.	13 days in.	Twice I.U.D.; retained placenta got away with finger. No P.V.
3-para—L.P.	Eng.	10 days in.	Alveolar abscess opened, I.U.D. No P.V.
1-para.	Eng.	11 days in.	Forceps; twins; highly abuminuric; V.D. 1 P.V.
3-para.	Eng.	9 days in.	I.U.D.; placental débris. No P.V.
7-para—L.P.	Eng. & R.H.	13 days in.	Adherent placenta; manual removal; P.P.H.; V.D.; I.U.D.; some clots; I.U.D.; some placental débris. 1 P.V.
1-para—L.P.	Eng.	14 days in.	I.U.D.; placental débris; finger and curette. No P.V.
4-para.	Eng.	9 days in.	V.D.; I.U.D.; foetid retained lochia. No P.V.
1-para—L.P.	Eng.	11 days in.	V.D.; puerperal ulcer. No P.V.
1-para—L.P.	Eng.	8 days in.	Before V.D. membranes came away; V.D., more membranes; I.U.D, placental débris got away; 2- I.U.D. = negative. No P.V.

Total No. of cases delivered	. . . .	139
No. of 1-paras	. . . .	57
No. of X-paras	. . . .	82

December, 1905.—*Morbidity Cases.*

Eng.	. . . .	= 15 = 10.79 per cent.
R.H.	. . . .	= 5 = 3.52 ,,
Both	. . . .	= 5 = 3.52 ,,

Length of Time in Hospital of Morbid Cases.

Eng.	9	8	9	16	25	23	12	9	10	23	13	11	9	9	12
R.H.	0	0	0	0	0	23	12	0	0	23	0	11	0	0	12
Both	0	0	0	0	0	23	12	0	0	23	0	11	0	0	12

1-paras	. . . .	= 10 = 17.54 per cent.
X-paras	. . . .	= 5 = 6.09 ,,

Analytic Study of Morbidity Cases.

1-para.	Eng. & R.H.	8 days in.	Influenza: quinine. No P.V.
1-para.	Eng. & R.H.	8 days in.	Macerated 7 months' foetus; I.U.D.; twin. No P.V.
1 para—L.P.	R.H.	11 days in.	Third day, V.D. membranes came away; 4th day, I.U.D. once. No P.V.
3-para.	Eng. & R.H.	17 days in.	Pleuritic pain right side; became maniacal 5th day; Bromides, 2nd evening; culture I.U.D.; cocci found. 1 P.V.
5-para.	Eng.	8 days in.	V.D. No P.V.
4-para.	Eng.	12 days in.	Sixth day, V.D. No P.V.
1-para.	Eng. & R.H.	12 days in.	Forceps; P.P.H.; ante-placental; I.U.D.; 7th evening. 1 P.V.
3-para.	Eng.	14 days in.	I.U.D. 5th evening, and culture; diplococci; streptococci; bacilli. 1 P.V.
1-para.	Eng.	8 days in.	Macerated 8 months' foetus; 2nd day, V.D. membranes came away; 3rd day, I.U.D and culture; culture = 0; 5th evening, I.U.D. No P.V.

TABLE No. IX.—*Maternal Mortality.*

Name	Admitted	Delivered	Died	Cause of death	Notes
A. H.	Mar. 3	Mar. 3	Mar. 4		
E. C.	Mar. 16	Mar. 16	Mar. 16	Haemorrhage	Placenta praevia
E. N.	May 19	May 20	June 25	Pyaemia	
M. O'N.	June 24	June 25	July 13	Typhoid	Admitted with disease
M. K.	July 20	July 22	July 22		
M. M.	Aug. 8	Aug. 8	Aug. 8	Haemorrhage	Concealed accidental
M. G.	Oct. 14	—	Oct. 14	Eclampsia	Undelivered
E. H.	Oct. 27	Oct. 27	Oct. 27	Haemorrhage	Post-partum

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