method is that one seldom needs to use any other incision than the lateral gridiron one. This incision is an easier one to close without running the risk of adhesions, and even where complete reduction has not occurred there is nearly always sufficient reduction to make it possible to deal with the unreduced portion through the incision. Moreover, should it be necessary to make a temporary enterostomy the right iliac region is a better position for it than the middle line. There is also less handling of the bowel and less chance of its prolapsing through the incision. I have tried using a thin barium solution, and then taking an x-ray instead of using saline solution, but I have not found any advantage in this method.

Operative Treatment

In the following conditions an open operation will be necessary.

1. When there is no definite proof that complete reduction has been effected, as where the thick oedematous bowel can still be palpated after the injection.
2. When the partially reduced intussusception can be felt.
3. In long-standing cases, when it is difficult or impossible to feel the tumour either before or after treatment.
4. In cases in which the intussusception has recurred.
5. In the subacute and chronic cases, which usually occur in older children or adults, and where a polypus may have been the cause, or where the intussusception may have started in the appendix.

Although a right muscle-splitting incision can be used in the majority of cases, especially where hydrostatic pressure has been employed, a middle-line or paramedian incision should be used in all cases where the intussusception is a large one, extending possibly into the descending colon. Some of the reduction can be effected without withdrawing the tumour from the abdomen, and even if withdrawn, it will have to be returned inside the abdomen to reduce the portion in the splenic and hepatic flexures. The actual reduction is effected by squeezing the tumour so as to force the intussusceptum from the intussusciens in a retrograde direction. Where reduction of the last portion is difficult it can sometimes be hastened by enclosing the tumour in a warm moist sponge and manually compressing it for a few minutes; gently dilating the neck of the intussusception by inserting the little finger through it alongside the entering layer will also help reduction. Although efforts at reduction by attempting to pull the intussusceptum from the intussusciens are usually not advisable, the last portion may have to be reduced in this manner, or by alternately squeezing the tumour and then gently pulling on the entering bowel.

Treatment when Reduction is Impossible

It is difficult to decide just when to discontinue attempts at reduction, because the bowel is seldom actually gangrenous, even in long-standing cases, and the mortality after resection is extremely high. It is therefore well worth while making a fairly long attempt to reduce by manual pressure, provided this does not result in a complete tear through the bowel wall, because it is impossible to suture such a tear satisfactorily. As a number of cases have been reported in which lateral anastomosis, leaving the unreduced portion *in situ*, has proved successful, it is well worth a trial where it is obvious that the infant will not stand resection. There are two other methods: resection, followed by temporary enterostomy; and temporary enterostomy and retention of the intussusception. Very rarely indeed does the infant survive either of these measures, but desperate cases may occasionally be saved by resorting to one or other of them.

Where an intussusception has recurred one may prevent a repetition of this either by fixing the caecum to the

peritoneum low down in the right iliac fossa, after removing the appendix, or by shortening the mesocolon by the method usually employed in dealing with a mobile ascending colon.

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INDUCTION OF LABOUR

BY

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While the normal cause of the onset of labour remains a mystery, generations of obstetricians have longed for a safe and easy method of terminating pregnancy. Much ingenuity has been expended and many methods have been devised for bringing this about. Labour can sometimes be started by using drugs such as castor oil and quinine. This method has been extensively employed for some years, but it is too unreliable to be of much real value. Other methods almost universally practised rely upon the introduction into the uterus of some foreign body. A hydrostatic bag, bougies, or a stomach tube may be employed. There are obvious objections to such treatment. The onset of labour is uncertain and may be long delayed, when the presence of a foreign substance within the uterus is more likely to prove a source of infection with each day that passes. There is always great discomfort and usually much pain from the pressure within the cervix. The stomach tube is probably the most painful, and much misery may be caused in this way, an unfortunate introduction to the ordeal of labour to come. The bag may come out as the cervix dilates, when the commencing labour will probably cease. The passage into the uterus of the bougie or tube may cause furious haemorrhage which is alarming, though I myself have never seen any real harm result from this cause. For these reasons, and also because an anaesthetic is required during the introduction of the bag, bougie, or tube, induction of labour in this way is necessarily employed only in an emergency of some gravity.

Simple Rupture of the Membranes

Induction by simple rupture of the membranes carries the authority of considerable antiquity. It was practised towards the end of the eighteenth century. Later it fell into disrepute, probably upon theoretical considerations owing to the importance attached to the bag of membranes as a factor in dilating the maternal passages. Nevertheless, it is mentioned by such writers as Ramsbottom and Smellie. More recently it has been advised in many textbooks, but paradoxically only in certain morbid conditions, of which the most important are antepartum haemorrhage and eclampsia. The method has lately been revived, and indeed it is difficult to understand why its more extended application was not suggested long ago. There is already a considerable literature, and careful reports have been published by FitzGibbon¹ and Morton² on series of normal cases, by Berger,³ who used it principally in post-mature cases, and by Stroganoff,⁴ who clearly demonstrated its benefit in eclampsia. In spite of much careful work induction by rupture of the membranes is still looked upon with disfavour by a majority of practitioners, but it certainly approximates closely to the normal onset of labour. Of 150 consecutive cases of normal labour admitted to the

Woking Maternity Home, in forty-four (27 per cent.) rupture of the membranes had occurred before admission, usually as the first sign of the onset of labour. The frequency with which this occurs is not always appreciated.

The method provides three advantages of great importance:

1. No anaesthetic is required in a very large majority of cases.
2. The patient feels no pain and can get up and behave normally until labour starts.
3. There is no foreign body in the uterus and consequently no nasty discharge and little (if any) increased tendency to the development of a morbid puerperium.

In the following analysis of 115 cases I hope to confirm the excellent results already reported by the writers referred to, and to show that rupture of the membranes, as a method of inducing labour, provides a great advance upon the procedure usually adopted, and that it may be applied with success in a wide variety of conditions. In all these cases the induction was performed by myself, and in a majority I was able also to supervise the patient afterwards when medical attention was required. The methods employed, therefore, have been as nearly as possible uniform throughout the series, and the results are not confused by differences in technique and after-treatment.

Method of Induction

The method adopted throughout the series is as follows. A preliminary dose of castor oil is given whenever possible. The patient may lie on an ordinary bed, but an examination couch or operating table is more convenient. An ordinary vaginal examination is made to confirm the presentation and to estimate the degree of disproportion, if any. The middle finger is then passed along the cervix until the presenting part is reached. A pair of small peritoneum forceps (Rutherford Morrison's) is then passed along the finger into the cervix, opened, pressed against the presenting part, and closed. The membranes are thereby caught up and can be broken with the finger, which is still in the cervix. The head of the foetus must be supported by an assistant or it will retreat when the forceps come against it. The whole operation takes about two minutes. The cervix is usually directed strongly backwards, and must be hooked up and straightened out with the finger. In primiparous women this little manoeuvre requires some practice, but it is always perfectly easy under an anaesthetic. Sodium evipan is very suitable and was often used, but in the later cases no anaesthetic has been required. In one patient the cervical canal was too narrow to admit a finger, and dilators were needed, but this must be most exceptional. The only preparation adopted is a simple wash down, twice repeated after the perineum is shaved. No vaginal douche is used. The rupture should be followed by a definite gush of liquor. If only a few drops escape it is probable that the chorion alone has been torn. A few hairs from the baby's head provide good evidence of efficient technique.

This procedure is extremely simple and quick. It is also practically painless. In district practice the patient can be sent home to have the baby, which is an advantage when beds are full.

Indications for Induction

In this series the indications for induction may be grouped as follows:

Diabetes	...	...	...	...	1
Cardiac breakdown	...	...	...	...	2
Hydrocephalus	...	...	...	...	1
Chorea	...	...	...	...	2
Pyelitis	...	...	...	...	5
Toxic A.P.H.	...	...	...	...	1
Mild toxæmia, hyperpiesis, etc.	...	...	...	...	24
Grave toxæmia and eclampsia	...	...	...	...	7
Disproportion, bad obstetric history, etc.	...	...	...	...	68
Breech with legs extended	...	...	...	...	4

Without discussing at length the possible indications for inducing labour, I should like to call attention to three common conditions in which rupture of the membranes has given very satisfactory results.

1. It is common to find women at term who complain of backache and general discomfort, which may persist for two or even three weeks before labour begins. This is distressing for the patient and embarrassing for the medical attendant. Rupture of the membranes in these cases is usually quickly followed by the onset of pains and usually a rapid labour.

2. A breech presentation after version will sometimes recur, especially if the pelvis is small. When this happens and the child is a good size, rupture of the membranes may be done after version, and this will maintain the vertex presentation.

3. Cases of mild toxæmia are common, and each contains the elements of a tragedy. Grave developments may supervene with dramatic violence and cannot always be foreseen. Rupture of the membranes before term provides an easy way of terminating the pregnancy and of saving the patient from two or three weeks of exceptional danger.

Onset of Labour

The exact moment when labour starts is often difficult to determine, but the series is analysed as accurately as possible in the following table:

Onset in	Primiparae	Multiparae
1-6 hours after rupture	28	23
6-12 "	14	14
12-18 "	5	6
18-24 "	10	3
24-48 "	6	3
Over 48 "	1	2

It will be seen that contractions begin within six hours in nearly half the cases (47 per cent.). No fewer than 85 per cent. come into labour within twenty-four hours, but occasionally a patient will have no pains for two days or longer. I have never been able to recognize the factor which accounts for this. There is no real difference in this respect between primiparous and multiparous women, although delayed onset of labour is perhaps slightly more common in the former.

The stage of pregnancy, whether at term or premature, is apparently of no importance. In my experience this condition is really exceptional, and delay in onset usually means that the membranes have not been ruptured and no liquor will be found on the pad.

Uterine Inertia and Instrumental Delivery

If any method of induction is to be of real value it must be followed by normal uterine action. The duration of labour in the present series is given in the following table:

Length of Labour	Multiparae	Primiparae
1-6 hours	26	12
6-12 "	18	17
12-18 "	5	15
18-24 "	2	12
24-48 "	—	5
Over 48 "	—	3
Forceps delivery	1	11

When the membranes are ruptured and pains commence they are often indefinite and annoying for some hours before any useful result is produced (niggling pains). In rare cases this state of things may persist for as long as five days, and it seems particularly apt to occur in primiparae. In the opinion of the maternity home staff these niggling pains are at least no more troublesome or frequent than in the case of women who start labour without interference. It has even been suggested that regular pains start more rapidly after the membranes have been ruptured, and this is my own impression. It is most

difficult to produce any definite evidence from the labour ward notes upon this point. There is no doubt, however, that when the pains are once established the uterus works most efficiently, and it does not appear that premature rupture of the membranes interferes in any way with the course of labour. On the contrary, the labour ward staff are unanimous in declaring that labour progresses with unusual ease and rapidity. This rather surprising fact was noted also by Morton, who states that the duration of labour is approximately halved if the membranes are ruptured artificially. Few will deny that the duration of labour shown in the table above is well within normal limits, and the low forceps rate is also satisfactory. The results in this respect are even more striking when it is recalled that a majority of the cases in this series were derived from those referred to the Woking Maternity Home on account of disproportion, bad obstetric history, toxæmia, and similar conditions in which uterine inertia might reasonably occur. In this relatively well-nourished district genuine pelvic deformity is extremely uncommon, and during the past two years it has been necessary to perform only five Caesarean sections on this account. On the other hand, definite disproportion, usually the result of an overfed child in a small mother, is far from rare, and such cases are usually associated with a high forceps rate.

Puerperal Morbidity

Most methods of induction are associated with a high rate of puerperal morbidity, and it is worth while analysing that of the present series in some detail. Every case is included in the table below in which the temperature rose to 99° F. or more between the second and eleventh days. Many cases are therefore included which did not attain the gravity of notifiable puerperal pyrexia.

Maximum Temperature:	99-99.2°	99.2-100°	100-101°	101.2-102°	102.2-103°
Duration of pyrexia above 98.8° F.:					
1 day... ..	91	45	29	112	
2 days	22	26		117	
3 days	38	27		113	
4 days			110	114	
5 days	14	28		115	
7 days			111		216

1. Including one case of breech presentation with extended legs which required extraction. The rise of temperature in the others mostly occurred on the third or fourth day, and was possibly due to engorged breasts and constipation.

2. One case of difficult forceps, the other had painful hard breasts.

3. Including one case of forceps for persistent R.O.P. presentation.

4. Ruptured perineum with inflamed and sloughing piles.

5. Including one case with hard and painful breasts and one in which the temperature rose on the ninth evening for some reason.

6. Including one case probably due to hard and painful breasts, the other following a forceps extraction.

7. In both cases the fever coincided with the development of hard and painful breasts.

8. In one case following forceps the perineum much inflamed, in the other all the chorion was retained.

9. One case probably due to engorged breasts, the other followed severe eclampsia (thirty-five fits).

10. Following a difficult forceps extraction with lacerated and inflamed perineum.

11. Following an awkward face presentation with sloughing lacerations of the vagina and perineum. This was the only case in which the pyrexia gave rise to any real anxiety. Sent to Queen Charlotte's Hospital (Isolation) and returned with the report "mild puerperal sepsis due to sloughing and infected vaginal and perineal lacerations."

12. A single temperature spike as the breasts filled.

13. Following labour with severe toxæmia.

14. Following forceps delivery with lacerated and "messy" perineum.

15. Exacerbation of pyelitis.

16. One case of tonsillitis, the other a pyelitis which subsided within a week.

17. Bowel upset on fifth day from constipation, with abdominal pain and marked distension.

In addition to the above there was one fatality—Mrs. N., primipara, 22 years of age, a moderately severe case of toxæmia. Ante-natal treatment for ten days without much improvement. Condition was not good before labour, which started seven hours after induction and lasted fourteen hours to the birth of the child (low forceps). At this stage there was profound shock, with a pulse rate of 160. The placenta could not be expressed, and was removed eight hours later under chloroform anaesthesia. A contraction ring was present. The shock increased in intensity and she died fourteen hours after delivery. The total loss of blood was under one pint.

Whatever errors there may have been in the conduct and treatment of this case, which terminated in such a fearful tragedy, I cannot feel that the induction by rupture of the membranes was in any way to blame.

With regard to the cases of pyrexia, these total thirty-six in the whole series of 115 inductions. In a large number of these cases some abnormality was present before labour started or intervention was required during delivery. In order to estimate more accurately the influence of rupture of the membranes as a cause of pyrexia, I have made a further analysis of *all* the more normal cases in the series. The cases excluded comprise those in which manual or instrumental delivery of the child was required; cases of gross laceration of the genital passages (first degree tears are *not* excluded), ante-natal toxæmia, and pyrexia; and of independent pyrexial diseases (tonsillitis, etc.). Twelve of the remaining sixty-eight cases developed some degree of pyrexia, the duration and severity of which is shown in the following table:

Maximum Temperature:	≤9°	99.2°	99.4°	99.6°	99.8°
Duration of pyrexia:					
1 day	5	1	1 ^x	1 ^x	
2 days	1		1 ^b	1 ^x	
3 days					1 ^x

In eleven cases the rise of temperature occurred on the third or fourth evening. Those cases marked by an "x" are noted as having hard and painful breasts requiring hot bathing. In one patient marked "b" the pyrexia was associated with abdominal discomfort and constipation. In all cases the baby was alive and vigorous and the maternal condition never caused the least anxiety. It is suggested that there is no evidence here that artificial rupture of the membranes under suitable conditions increases the tendency to pyrexia in the puerperium, and these results are in accord with the observations of all who have made an extensive trial of this method. In this respect it is also interesting to note that I have not been able to trace any relation between pyrexia and the length of time which elapses between rupture and the onset of labour.

Foetal Mortality

Early rupture of the membranes is commonly supposed to exert a prejudicial effect upon the child, but this *has* not been the experience of any of the authors referred to above. In the present series ten children were born dead, and this number is made up as follows:

Craniotomy	...	...	...	...	1
Non-viable	...	...	...	...	2
Macerated foetus	...	...	...	...	3
Stillborn	...	...	...	...	4

The last item is composed of the following cases:

1. Breech presentation with extended legs in primipara.
2. Diabetic. Child probably died just before labour.
3. Normal delivery of badly extended face presentation. Post mortem the foetus showed gross intracranial haemorrhage.
4. Forceps delivery with serious delay in birth of the shoulders. The foetal heart was vigorous just before the extraction was begun.

There is little evidence here that early rupture of the membranes exerts an unfavourable influence upon the child. The foetal head plugs the cervix, and even if the onset of labour is delayed for several days the liquor does not all drain away. In the so-called "dry labour" with slow progress the important factor is uterine inertia, unfavourable presentation, or grave disproportion. In the last two conditions the presenting part may not fit accurately the maternal passages, and the amount of liquor forced down may lead to early rupture of the bag of waters, which is the effect and not the cause of the conditions present. A number of patients in this series were submitted to induction at term, or shortly before, on account of bad obstetric history. In every case the result was most satisfactory. Labour progressed normally and in no single case did the child appear to suffer in any way.

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A NOTE ON ARTIFICIAL PYREXIA IN EPILEPSY

BY

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Many observers have reported improvement in epileptic subjects during the course of an intercurrent febrile illness. Guthrie¹ has reviewed 200 cases of epilepsy where records of convulsions had been noted for stated periods before and following an acute febrile illness: the chief feature of his analysis is the decrease in the number of seizures which occurred during the period of illness. Hamilton² noted a temporary improvement in nine out of eleven epileptics who contracted typhoid fever. Reduction in the incidence of fits during attacks of influenza have been reported by Gordon³ and by Maillard.⁴ These clinical observations find confirmation in the experimental work of Wortis,⁵ who observed that animals having febrile infections are less subject to seizures when given standard amounts of convulsant drugs.

The beneficial effect of intercurrent fevers in epilepsy has suggested the use of malaria as a therapeutic agent in this disorder. Ramsay,⁶ using induced malaria in six chronic epileptics, found a temporary reduction of fits in four cases; he concludes, however, that the induction of pyrexia by this agent is not free from danger. Arias⁷ noted a decrease in the number of fits in eight out of twelve cases treated with malaria. Other authors have reported improvement following the use of protein therapy in epilepsy—Edgeworth⁸ and Steel.⁹

Material Treated

In the present investigation pyrexia was induced over a twenty-day period by intramuscular injections of sulphur in oil, the preparation used being "colsul." The technique adopted was similar to that described by Schroeder¹⁰ in the treatment of general paralysis and dementia praecox. The clinical material consisted of eight institutional cases of essential epilepsy, which were subject to frequent major seizures. The patients treated varied in age from 18 to 58 years, and in all cases

the epileptic habitude was well defined, and some degree of mental deterioration was present. The number of seizures that were present for twenty-day periods before, during, and after fever treatment are shown in the table.

Case No.	Present Age	Number of Seizures		
		During Previous 20 Days	During Pyrexia (20 Days)	During Succeeding 20 Days
1	18	17	4	9
2	19	13	7	30
3	13	23	7	14
4	28	7	4	2
5	58	7	2	10
6	22	72	44	70
7	58	14	8	5
8	32	10	4	9

Results

In this series a reduction in the incidence of fits was found in every patient during the pyrexial period. The majority of seizures occurred when the temperature was falling or in the interval between attacks. In four cases the incidence of fits remained below the average for the twenty-day period following treatment; in three no definite improvement was noted, and in one patient an increase in the number and severity of attacks occurred during this period. With one exception the mental condition was favourably influenced during treatment, a result which can be regarded as of practical importance. Troublesome patients became more amenable, and showed no tendency to quarrel or complain. Fever attacks were well tolerated in all cases, and no unfavourable effects were noted. It has been stated that rest in bed is an important factor in limiting the number of convulsions in chronic epileptics.¹¹ In the present group no significant diminution in the incidence of fits was noted in seven cases, while one patient showed an increase in the number of seizures during a period of twenty days' rest in bed.

Conclusion and Summary

It is not easy to discover why fever should limit the number of fits in epilepsy. The association of certain physico-chemical processes with a reduction in seizures is now generally acknowledged. Chief of these are the establishment of acidosis, of dehydration, and of cerebral vaso-dilatation. It seems reasonable to assume that the value of fever in epilepsy is dependent on the operation of these processes.

To summarize: induction of pyrexia by "colsul" in eight chronic epileptics was accompanied by a temporary decrease in the number of seizures; improvement in the mental condition occurred during the period of fever.

I am indebted to Dr. J. Brander, medical superintendent, Colney Hatch Mental Hospital, for permission to investigate the cases reported in this paper.

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