During the war Professor Leiper with his colleagues discovered the life-history of *Schistosoma haematobium* and *S. mansoni*. Previously nothing was known of the life-cycle of these particular species of schistosomes, though the Japanese had worked out the complete life-history of *Schistosoma japonicum*, to which I have already referred.

Future of Tropical Medicine

The examples I have given do not in any way exhaust the remarkable discoveries that have been made in the field of tropical medicine during the past thirty or forty years. They serve, however, to illustrate the importance of this branch of medicine as a special subject. It has been said that all the great discoveries in tropical medicine have already been made and that most of the plums have been gathered. In one sense this may be true, and though we hardly expect in the future such dramatic discoveries as the parasite of sleeping sickness or the method of spread of malaria, there are many problems which await solution, as, for instance, the causes of blackwater fever and sprue. It is perhaps in the realms of biochemistry and experimental laboratory research that future discoveries will be made.

From the clinical viewpoint the future of tropical medicine lies in the increasing application of laboratory methods and co-ordinated team work. The keystone to the arch of correct diagnosis frequently lies in the clinical laboratory, and in many instances can only be made by means of its help. Apart from the demonstration of infective agents such as protozoa, helminths, Rickettsia bodies, and spirochaetes, etc., serological, biochemical, and haematological data are becoming more and more essential, not only in diagnosis but also for controlling treatment.

The growing importance of tropical medicine resulted, as I have indicated, in the founding at the beginning of this century of schools of tropical medicine, where this subject could be taught to those taking up medical work in tropical countries. It also had another result, and that was the establishment in London in 1907 of the Society of Tropical Medicine. This society began in a small way, but has steadily grown in membership and importance. It became in 1931 a Royal Society, and in place of the rented rooms which it at first occupied, it now has premises of its own in Portland Place—Manson House—which was opened by the Prince of Wales on March 17th, 1932. On its roll of membership to-day there are nearly 1,700 Fellows, representing tropical medical interests in all parts of the world. Among the Fellows in our own Empire are to be found members of the staffs of all the various tropical schools and institutes; of the Navy, Army, and Air Force; of the Colonial and Indian Services; and of many other organizations which send medical men to the Tropics, while tropical medicine outside our own Empire is fully represented by a long list of Fellows from many other countries. The society, the largest of its kind, now stands as the centre of tropical medicine for our Empire.

Tropical Medicine in Australia

Tropical medicine is of great importance to Australia and her Mandated Territories, and that is why I have dealt with the subject somewhat fully. You have here already malaria, sprue, dysentery, ulcerating granuloma, yaws, leprosy, dengue, and filariasis, and if care is not taken other diseases and parasites may be introduced, just as *Filaria bancrofti* was by the Chinese many years ago. The founding of a Tropical School in Sydney shows, however, that you have appreciated this danger, and if doctors who are destined for the Northern and Mandated Territories are given an adequate training to enable them

to deal with the special diseases to be found in those regions, then all will be well. They will be able not only to recognize them, but also to treat and prevent them. By their knowledge they will be instrumental in stopping the introduction of other scourges, which, if allowed to take root, will bring death or ruined health to many people, and will necessitate vast expenditure of money and labour before they can be effectively controlled or eradicated. As was the case with the construction of the Panama Canal, the success of any enterprise in a tropical country, whether in this or any other land, is directly proportionate to the extent to which tropical diseases are controlled by a proper practice of tropical medicine in all its aspects.

INTUSSUSCEPTION*

BY

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Before commencing the subject of intussusception I would like first of all to pay tribute to my old teacher and colleague, the late Sir Charles P. B. Clubbe, whose work on this condition is well known. It was his intense enthusiasm in the subject which first aroused my own interest in this connexion.

Statistical Review

An analysis of the cases of intussusception which have been treated at the Royal Alexandra Hospital for Children, Sydney, during the years 1921 to 1934 inclusive showed that 486 cases had been treated by ten surgeons; 430 of the patients recovered and fifty-six died, a mortality rate of 11 per cent. Three of the surgeons made a practice of using a preliminary injection of saline per rectum before operating, and their combined mortality rate was 9.8 per cent. The other seven operated in all cases without a preliminary injection, their combined mortality rate being 14 per cent. In the series of 486 cases there were 313 males and 173 females.

The ages of the children were as follows:

1 to 3 months	...	10	12 to 24 months	...	35
3 to 6 months	...	156	3 years	...	6
6 to 9 months	...	190	5 years	...	2
9 to 12 months	...	83	7 years	...	1

The graph (see below) shows the incidence of the condition at different ages from 1 to 21 months.

Although there were generally about an equal number of cases treated during each of the months of the year, there were actually 158 cases treated during the hot months—November, December, January, and February—and 151 during the colder months—May, June, July, and August. This suggests that gastro-enteritis may play a minor part in the causation of some cases.

* Read in opening a discussion in the Section of Diseases of Children at the Annual Meeting of the British Medical Association, Melbourne, 1935.

Use of Injection

Below are given the results obtained by the three surgeons who used a preliminary injection of saline before deciding upon operation.

Surgeon A treated 42 cases, and reduced 45.2 per cent. by injection: reduced without operation, 10; found reduced at operation, 9. Unreduced by injection, 23.

Surgeon B treated 46 cases, and reduced 43.4 per cent. by injection: reduced without operation, 13; found reduced at operation, 7. Unreduced by injection, 26.

Surgeon C treated 83 cases, and reduced 57.8 per cent. by injection: reduced without operation, 35; found reduced at operation, 13. Unreduced by injection, 35.

Author's Results.—In a series of 54 cases which I have treated since May, 1926, the results were as follows: reduced without operation, 20; found reduced at operation, 14; unreduced at operation, 20. Reduction by injection was thus obtained in 62.9 per cent. Since November, 1918, when I commenced using hydrostatic pressure to bring about reduction, I have treated 159 cases with the following results: reduced without operation, 64; found reduced at operation, 32; unreduced by injection, 63. Reduction by injection was therefore obtained in 60 per cent.

The average duration of the cases reduced by hydrostatic pressure in a series of 159 cases was as follows. In cases reduced by hydrostatic pressure where no operation was performed the average duration was sixteen hours. In ten of these the duration was over twenty-four hours, in three over forty-eight hours, and in one over three days. The average duration of the cases in which an operation was done to make sure that reduction had been effected was nineteen hours. The average duration of the cases which could not be reduced by injection was thirty-one hours.

Recurrent, Irreducible, and Fatal Cases

In my own series of 100 cases, which were reported in the *Medical Journal of Australia*,¹ there were nine recurrent cases. Seven cases recurred one week, four weeks, two months, five months, four months, four months, and eighteen months respectively after the first attack. One case recurred six times in two years, and another three times in nine months.

In the series of 486 cases treated by ten different surgeons there were five patients in whom the bowel was resected; all died. In four patients the bowel was torn through in attempting reduction, and all died. In one child suffering from whooping-cough the abdominal wound gave way on the sixth day, and the child died. Two children died from bronchopneumonia fourteen days after operation. There were several cases where reduction was effected without any difficulty, and the children died on the fourth or fifth day from general peritonitis or from intestinal obstruction. Six of the children died either on the table or shortly afterwards from shock.

The mortality of 486 cases mentioned in this paper was 11 per cent. In 210 cases of my own (fifty-one reported in the *Medical Journal of Australia*, November, 1918, 105 in the same journal, August, 1926, and fifty-four reported in this paper) there were fourteen deaths, a mortality of 6.6 per cent.

Varieties

Naming the varieties according to the starting-point of the intussusception, and calling the variety where the apex passes through the ileo-caecal sphincter "ileo-colic," the classification will be as follows: ileal, ileo-caecal, ileo-colic, caecal, and appendicular.

Some authorities maintain that certain of the so-called ileo-colic forms are produced by a prolapse of the last few

inches of the ileum through the sphincter, and that the apex therefore constantly changes. It is difficult, however, to prove this, and the origin of this variety is probably the same as in all other forms. According to some authorities also there is no true caecal or so-called caeco-colic variety. They maintain that these should be included in the ileo-caecal forms, and that the dimple in the caput caeci, marking the last portion to unfold on reduction, is produced by partial strangulation of this portion of the caput during the progress of the ileo-caecal type. If such is the case, why is the dimple not present in all ileo-caecal varieties? Clubbe² found that in 30 per cent. of his cases the caput caeci was the last part to unfold, and that in 28 per cent. the ileo-caecal sphincter appeared to be the starting-point; also that 30 per cent. of his cases were ileo-colic.

Any of the varieties may become double—that is to say, the original intussusception stops at some point, and then forms the starting-point of a second by becoming invaginated into the bowel distal to it. In the same way triple and even quadruple forms may occur. Intussusception may occur in two sections of the intestinal tract simultaneously, forming multiple varieties.

Retrograde Intussusception

Occasionally one encounters a double intussusception, one portion of which appears to be of the retrograde type. Here an intussusception of the direct type, after progressing for a certain distance, stops at that point instead of passing onwards. The intussusception so formed then passes backwards into the bowel proximal to it. I have seen one such case, and unless one is aware that such a condition may occur it may cause some delay and confusion in attempting reduction. Dr. Philip Buckley³ is of the opinion that these are formed by the meeting of two intussusceptions, one being direct and the other retrograde, the direct passing for a short distance into the retrograde. Two methods of formation of a double intussusception, one portion of which is of the retrograde type, are shown in the diagram below.

A. Direct intussusception (to the right) passes in a retrograde direction and becomes a double intussusception.

B. Multiple intussusception, one direct, the other retrograde.

C. Double intussusception formed by the meeting of the two varieties shown in B. The retrograde has included portion of the direct.

Aetiology

There is no doubt that anatomical, physiological, and pathological factors play a part in the causation of intussusception. I believe also that heredity is a factor.

Let us take the anatomical features first. The great majority of cases occur in the neighbourhood of the ileo-caecal sphincter. This is a region where there is a great disproportion between the diameters of ileum and caecum, particularly at the age period when intussusceptions are common. At birth, and during the first few weeks of life, there is no great disproportion between these two portions of the intestine. The mobility also of the ileo-caecal region is greater in infancy than in later life, and in my experience a mesocolon of variable length is

present in most cases of intussusception. In one of my cases the apex of the intussusception, which was of the ileo-caecal variety, projected five inches beyond the anus. A fact also worth noting is that failure of rotation of the mid-gut loop—that is, the stage of fixation of the mesentery—is, like intussusception, more common in males. Intussusceptions generally occur in the thinner ileum, and, at any rate in children, practically never in the thicker-walled jejunum. Another anatomical factor, to which I called attention thirty years ago, is that Peyer's patches are more numerous in the lower ileum, and one of them may form the starting-point of an intussusception.

As regards the physiological factors, Fraser⁴ has pointed out that the ileo-caecal region is one in which there is a peculiarity with regard to the type of nerve supply. The ileum receives a supply from both the sympathetic and parasympathetic systems, and the caecum and ascending colon from the sympathetic only. One can readily understand that, as a consequence, this would be a region where some irregularity in the peristaltic movements of the bowel would be prone to occur. Anti-peristalsis of the ascending colon and caecum is a normal occurrence in some animals, but I understand that such has not been demonstrated in man. If anti-peristalsis did occur here it would naturally predispose to intussusception. Fraser draws a parallel between what he terms the arrhythmias of infancy and early childhood (6 months to 2 years), the period when intussusceptions commonly occur, with the achaliasias of early infancy. Both conditions are probably due to some defect in the neuro-muscular mechanism. It is interesting to note that both these conditions, as well as the purely anatomical one (abnormality of rotation of the mid-gut loop), are more common in males. Several of the cases in my series began immediately after a fall out of a perambulator, an occurrence which might be expected to set up irregular peristalsis.

A few cases of intussusception occur during an attack of enteritis, but the great majority are seen in children who appear to be in exceptionally good health. In the series of cases referred to in the earlier part of this paper I found that about an equal number occurred in each month of the year, there being a slight preponderance in the hotter months, suggesting that gastro-enteritis may play a part. Occasionally some dietetic error starts the trouble, for grape skins or seeds, pieces of paper, etc., are occasionally found in the first return from an enema after reduction. Rarely, a polypus may form the starting-point of an intussusception, but I have never met with such a case in children.

Although heredity probably plays only a minor part in causation, it is quite likely that more thorough investigation might show that its role is more important than is commonly believed. I have seen several instances where two children in the same family have suffered from intussusception, and one where the father had had an intussusception in infancy. It is seldom that parents can give details of their infantile ailments. One would expect a hereditary tendency in the occurrence of abnormalities of rotation of the mid-gut loop, and therefore of abnormalities of the length of the mesentery and mesocolon, just as heredity plays such a large part in other deformities.

Symptoms and Diagnosis

The symptoms of the typical case scarcely need enumerating. There is an extremely sudden onset of acute abdominal pain in a previously healthy infant. The pain is evidenced by the appearance of shock, with its symptoms of pallor, coldness of the extremities, rapid pulse, sweating, and subnormal temperature. The initial shock soon passes off, and is followed by restlessness, drawing up of the legs, vomiting, and later on by the

passage of blood-stained mucus. Such a history is unequivocal evidence of an intussusception. The symptoms, however, are not always so obvious. The onset may occasionally take place during an attack of gastro-enteritis, and may thus be masked by those of this complaint. I have seen several such cases where the diagnosis has been delayed on this account.

A male child, aged 5 months, had been ill for two weeks with severe diarrhoea. There were seven to ten motions daily, occasionally blood-stained. Just before admission to hospital the child had a severe attack of abdominal pain, which was relieved by an enema. The diarrhoea continued, and more blood appeared in the motions. At this stage abdominal examination revealed the typical sausage-shaped tumour of an intussusception. This was reduced by hydrostatic pressure, and the infant was given a teaspoonful of powdered charcoal, which was recovered by an enema six hours later.

Occasionally no blood appears in the rectal discharge, even though the intussusception may have been present for several days. Such cases are apt to mislead even the experienced paediatrician. In one such case which I operated on the intussusception was of the ileo-colic variety, and commenced in the ileum ten inches from the ileo-caecal sphincter. In these cases it appears as if the intussusception acted as a plug in the ileo-caecal sphincter, completely preventing the passage of blood. Again, we sometimes see cases where, owing to an unusually long mesentery, an ileo-caecal intussusception may project several inches beyond the anus, and thus be mistaken for a prolapse. In such instances intestinal obstruction may not be complete for several weeks, and strangulation of the bowel is slow to occur because of the long mesentery. A case of this kind was reported by me in the *Medical Journal of Australia* (October 6th, 1934, p. 455). Then again, the shock may be so severe that death results before the diagnosis is made.

A male child, aged 12 months, became suddenly ill with symptoms of severe shock at 9 a.m. Vomiting occurred, castor oil was given, and as promptly vomited. The child did not appear to be in much pain, but twenty-seven hours after the onset it suddenly collapsed and died. Necropsy revealed a large intussusception.

Some cases undergo spontaneous reduction and recurrence at intervals over a period of weeks. The usual mass can be felt, but disappears before an operation can be performed, only to reappear later.

Lastly, there are chronic cases, which are often diagnosed as appendicitis or as enlarged lymph glands. In these cases it is the appendix which first invaginates, and they are generally seen in older children. Intussusception of the appendix is of two kinds: (1) a complete inversion of the appendix first occurs, followed by its passage along the colon, drawing the inverted caecum along with it; (2) the base of the appendix forms the starting-point, and the appendix only becomes partially inverted. Both varieties are slow to progress, and complete obstruction may not occur for several days, or not at all; hence the presence of a tumour is apt to be mistaken for a mass of glands or a faecal accumulation. Pure colonic varieties are sometimes seen in older children, and here also complete obstruction may not occur for several days.

A fact worthy of note in the acute varieties of intussusception is the absence of abdominal distension in the early stages of the complaint. For some time after the onset—it may be for ten or twelve hours—the abdomen remains comparatively soft and flaccid. This helps considerably in the treatment by hydrostatic pressure, and it also enables the mass to be felt with ease. The palpable mass is somewhat curved or sausage-shaped, but the resemblance to the form of a sausage is more fanciful than real. The situation of the tumour, of course,

depends on the variety and extent of the intussusception, but in the early stages it is always palpable, generally without, occasionally only after, the abdominal muscles have been relaxed by an anaesthetic. Later on—it may be after the lapse of thirty-six or forty-eight hours—it may be impossible to feel a tumour because of abdominal distension. At this stage the temperature rises, the pulse quickens, and the child soon becomes dehydrated, with sunken eyes and signs of collapse. The apex of the intussusception may sometimes be palpable per rectum, or may even project beyond the anus.

Intussusception may arise as a complication of other diseases. I have already mentioned its occurrence as a rare complication of enteritis. It may also arise as a complication of Henoch's purpura, and as this disease is accompanied by the passage of blood, and also sometimes by the presence of a palpable abdominal tumour, one can readily understand the difficulty at times in diagnosis. Henoch's purpura, however, occurs usually in children of 5 or 6 years of age, and complete intestinal obstruction does not result; but the fact remains that intussusception may occur as a complication in Henoch's purpura.

Intestinal Obstruction following Reduction

Where laparotomy has been done to effect reduction of an intussusception, especially where a mid-line or paramedian incision has been used, adhesions between the omentum and the abdominal incision, or between a loop of small bowel and the peritoneal surface of the incision, may occur. In all cases which I have investigated, when a second operation has been performed for the treatment of a recurrent intussusception adhesions have been present. If the small bowel becomes adherent, intestinal obstruction is apt to occur later on in childhood, because, as the child grows, there is likely to be unequal growth of the portions of the bowel above and below the adherent section, producing intestinal obstruction later on.

A female child, aged 10 years, was sent to hospital as a case of appendicitis. The appendix was removed, although it did not appear to be very inflamed. Symptoms of intestinal obstruction were present the following day, and the child died. Post mortem a loop of small bowel was found to be adherent to an old abdominal incision made when the child was 6 months old for the cure of an intussusception.

I have several times seen intestinal obstruction cause the death of children who had been operated on in infancy for intussusception. I have also seen intestinal obstruction caused by the contraction of the scar tissue which resulted from the healing of a ring ulcer which followed the reduction of an intussusception of several days' duration. Such a case was reported by me in the *Medical Journal of Australia* (March 28th, 1931, p. 378).

Treatment

There are two methods of reducing an intussusception: one by operative treatment and the other by injecting fluid into the bowel per rectum. Most authorities maintain that, under modern conditions, operative treatment is so safe that any other method is not worth considering. There is no doubt whatever that an intussusception can be completely reduced by injecting saline solution into the bowel, as I have tried the method out in a consecutive series of 159 cases, and reduction occurred in no fewer than ninety-six of them (60 per cent.). In only sixty-three of the cases did injection fail to reduce the intussusception, and in many of these reduction of the unreduced portion was so easy at operation as to make it evident that if a more persistent attempt had been made with the injection a much larger proportion of the cases would have yielded. In sixty-four of the cases I was quite sure that reduction had been effected, and the children were

returned to bed without any further treatment; but in thirty-two I made a small incision of the gridiron type, similar to the one commonly used in removing an appendix, so as to make quite certain that no portion of the intussusception remained. There was not one single instance in the sixty-four reduced cases where a mistake in the diagnosis of complete reduction was made, so that there is no necessity to condemn this method on the ground that one cannot be sure that reduction has been effected.

Two other surgeons at the Children's Hospital reduced thirty-nine cases out of eighty-eight, and out of these twenty-three were sent from the operating table without operation. Thus in these small series of cases we can claim that eighty-seven infants were saved the risk of a major operation with its not inconsiderable mortality.

Use of Hydrostatic Pressure

Technique.—A general anaesthetic is given. One must on no account use a Higginson syringe for the injection, as it is impossible to gauge the pressure by this means. A definite pressure is obtained by using a column of water from a height of three feet six inches. An ordinary douche can is quite satisfactory for the purpose, although it is better to use a glass vessel, in which the upper level of the column of water can be readily observed, and this must be not more than three feet six inches above the level of the table on which the child is lying. A few feet of rubber tubing and a large rubber catheter are connected with the glass container, and the catheter is inserted into the rectum for about two or three inches. The buttocks are pinched together around the catheter, so that no fluid escapes during the injection. It is important not to use any lubricant on the catheter, as it makes it more difficult to hold it in the rectum if the buttocks are slippery. The saline is allowed to run into the bowel for three or four minutes, and after disconnecting the catheter the saline is returned into a bedpan. A second and then a third injection are given, the whole process taking about ten minutes. The first return usually contains blood, the second is clearer and may contain a few specks of faecal material, and the third more faeces and perhaps flatus, both facts indicating a probable reduction.

The actual diagnosis of reduction depends on the fact that some of the saline has passed through the ileo-caecal sphincter and distended the small intestine, and in so doing produces a very decided distension of the abdomen. If the circumference of the abdomen is measured before and after the treatment there will usually be found to be a difference of from one and a half to two inches—that is, after all the saline has been drawn off from the large bowel. Owing to the fact that intussusceptions do not usually cause distension of the abdomen for a considerable time—usually for over twenty-four or forty-eight hours—it is generally quite easy to palpate the tumour before the injection is given. When the abdomen has become distended by the passage of the fluid into the small bowel the tumour has of course disappeared, but it would be impossible to feel a tumour if one were present. There are cases, however, where the tumour has been reduced, but for some reason the saline does not pass into the small bowel. In these instances one can feel the thickened ileo-caecal region, which had formed part of the intussusception, and as it is impossible to distinguish between this oedematous bowel and an unreduced intussusception one must make a small incision to verify the fact of reduction.

It is a good plan in cases where one has decided against operation to give the child about one teaspoonful of powdered charcoal before it leaves the operating table. This can be administered through a small catheter, which is passed into the stomach. An enema given four or five hours later will usually contain the greater part of this charcoal, and thus quite definitely establish the absence of intestinal obstruction. One great advantage of this

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

L. G. HIGGINS, M.B., F.R.C.S., M.C.O.G.

MEDICAL OFFICER, WOKING MATERNITY HOME

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