Therapeutically, autogenous vaccines are far preferable to others, but owing to the delay necessitated by their preparation it is often imperative to begin with a stock vaccine. By the time the autogenous vaccine is ready for use it may be too late, and the patient may not be in a condition necessitating such treatment. Still, the possession of an autogenous vaccine made from a given patient is useful for the direct contacts of the patient from whom it is obtained, and possibly also, in a less degree, for the more remote contacts.

In a localized epidemic local prophylactic vaccines should constantly be prepared for future use, so that pace may be kept with the modification of the strain as it passes through individual after individual.

Conclusions.

1. The influenzoid group of diseases may be subdivided for clinical convenience into two groups:

(a) Localized infections, with slight toxæmia—namely, coryza, catarrh.

(b) General infections, with much toxæmia and possibly septicaemia—namely, febricula, influenza.

2. The severity of symptoms in the second group depends partly on the susceptibility of the patient and partly upon the proportions of the various micro-organisms present, their strains, and the contaminating organisms present. It may be that there are some ultra-microscopic micro-organisms of whose existence we are, as yet, unaware, but I cannot help thinking that the bacillus of Pfeiffer is rightly named *B. influenzae*.

3. Partial and temporary immunity is conferred by an attack of febricula against influenza and by influenza against febricula.

4. Vaccines therefore, to be most efficacious, should be specially prepared from local material, and in an epidemic these vaccines should be systematically reinforced to keep pace progressively with the advance of the disease.

For permission to publish these statistics I am indebted to the Right Rev. A. A. David, D.D., late Head Master of Rugby School.

SPASMODIC STRICTURE OF THE UTERUS.*

BY

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THE tonic contraction of a zone of circular fibres in the uterus was formerly described as hour-glass uterus. This term is not satisfactory, for, although it gives an accurate picture of the interior of the uterus, the general impression conveyed is false, for the exterior of the uterus remains ovoid in contour and the narrowing of the lumen is not, as a rule, perceptible by abdominal palpation or inspection. The condition may also be described as localized tetanus of the uterus; in some types the clinical picture very closely resembles that of tetanus uteri, particularly in the later stages.

Many other terms have been applied to this condition, as Schroeder's ring, Müller's ring, retraction ring, the last of which has been discarded. Eardley Holland's definition, "the active retention of the foetus by the uterus," omits the third stage of labour altogether. I prefer the more convenient term, "spasmodic stricture of the uterus," or, for short, the less definite term used by De Lee, "strictura uteri."

I would urge that the term be applied only to those cases in which the contraction ring is the cause of difficult labour, no other obstruction being present. Where there is other cause of obstruction, and the lower uterine segment is stretched, the term retraction ring should be used.

Eardley Holland has under this heading reported two cases of shoulder presentation with prolapsed arm, where the lower uterine segment was greatly lengthened, and where at the Caesarean section great difficulty was found in extracting the child, owing to the tonic contraction of a ring of muscle. Personally, I should describe these as cases of obstructed labour with well-marked retraction ring.

History.—The earliest report found of this condition was by Smellie in 1743, in his *Collection of Prematural Cases and Observations in Midwifery*. He describes his case as "a

laborious one; the uterus contracted before the shoulders of the foetus."

Since 1907, when Andrews and Maxwell drew the attention of the Royal Society of Medicine to this condition as a cause of dystocia, the subject has been discussed from time to time, and a comprehensive survey of the literature was made by Clifford White in 1913.

Etiology.—The cause is unknown. It is assumed to be some abnormal irritation or irritability of the uterine wall. It is said to occur most frequently in neurosthenic primiparae, and to be associated with malpresentations, premature rupture of the membranes, uterine inertia, prolonged first stage, with repeated vaginal examinations or attempts at manual or hydrostatic dilatation of the cervix. None of these associated conditions were present in my case.

With regard to parity, Clifford White found that the condition occurred twice as frequently in multiparae as in primiparae.

Types.—Strictura uteri or hour-glass uterus has been most frequently described as occurring in the third stage of labour and causing incarceration of the placenta, formerly due in many cases to unwise administration of ergot. I have seen this occur, too, after an injection of pituitary extract during the third stage in an attempt to hasten a dilatory placenta. The spasm, however, may occur during any stage of labour and at any part of the uterus. It will then be as follows:

1. In front of the whole child.

2. Around some part of the child, as in my own and the majority of cases, around the neck and obstructing the shoulders; or, as in a case reported of breech presentation, around the arms and body. Lady Barrett has reported a case where the ring was formed around the neck of a hydrocephalic foetus presenting by the breech.

3. Following one twin and ahead of the second child.

The Contraction Ring.—As regards position, although it is certainly true that the ring may form at any part of the uterus yet it has most usually occurred at the level of Bandl's ring—that is, where the upper and lower uterine segments meet; hence the confusion as to nomenclature. The contraction ring may run very obliquely across the uterus, as in that case reported by Clifford White where it corresponded to the groove between the thigh and body of the child. He considers that the contraction ring is largely formed by the close moulding of the uterus to the foetus, and doubtless this is true in those cases where the membranes have ruptured early and the liquor amnii has drained away. Jardine states that in all his cases where the ring has been situated around the neck of the child the membranes have ruptured before labour has begun at all. These observations do not apply to my case, in which the membranes had to be ruptured artificially.

Mortality.—The condition is very serious. Hedley gives the maternal mortality as 40 to 50 per cent., the foetal mortality as 60 per cent., and states that 10 per cent. of the foetuses are macerated. The child dies of asphyxia, the contracted muscle interfering with the oxygenation of the foetal blood. The same circulatory disturbance allows infection of the uterus and its contents to occur, and the woman may die of sepsis or exhaustion.

Report of Case.

The patient, Mrs. B., a quartipara, gave the following history of previous labours:

1. In labour for three days and nights; child born alive; forceps.

2. Twins. One born alive, but died in a few minutes, forceps. The other had to be taken away, was born dead, and disposed of without either parent being allowed to see it.

3. Child born alive, 9 lb. weight; forceps. Subsequently the patient spent five weeks in hospital for repair of complete perineal tear.

Her mother told me that all these labours had been prolonged and very difficult, that the doctor had said that there was "a shelf inside her," preventing the birth. This appears to me to suggest strongly that the uterine condition was habitual to this patient with every labour. I was therefore prepared for trouble, but when I saw the patient a few days prior to labour I could find nothing abnormal. The child was presenting by the vertex, and the pelvis showed no sign of contraction. The abdomen was pendulous; I judged that there was a large quantity of liquor amnii, and the woman had insisted upon doing heavy housework, such as scrubbing, up to the last without wearing any abdominal belt or other support.

Labour started at midnight, but the pains were very slight for some hours. I was called at 8 a.m. The patient was still in the first stage, the os dilating slowly, membranes intact. She had been up all night, so I gave her 1/4 grain of morphine and left with instructions that she was to go to bed and sleep. I returned at 11,

* Read before the North of England Obstetrical and Gynaecological Society at Sheffield, November 18th, 1921.

and found the nurse very worried; she said that the patient had been in great agony; the patient herself said that the pain was continuous and very severe. For a while the pain appeared to be due to tonic contractions of the uterus, the contractions increasing and then diminishing, but never completely relaxing. The woman's general condition was extremely good, but she was obviously in tremendous pain.

The cervix being three-quarters dilated, I ruptured the membranes and waited for the head to fix, keeping the patient quiet with chloroform for about two hours. It was now thirteen hours since the onset of labour; the head showed no sign of fixing, but was balloting freely in the pelvic brim, and as I could perceive no cause for the delay I determined to make an intrauterine examination under full anaesthesia. This I did under ether, and found the following state of affairs:

The cervix was fully dilated and empty, the free edge hanging flaccid in the upper part of the vagina. During each pain the head would descend into the cervix only to recede again with equal regularity. I palpated the head, which was normal and presenting by the vertex. The pelvis was very roomy. Without any difficulty I passed my hand up beside the head and found that the uterine muscle was firmly contracted in a ring around the child's neck. Having passed the tip of one finger through this ring to confirm the diagnosis I withdrew to consider the position.

Both mother and child were in very good condition, but the contraction ring must now have persisted for some hours in spite of morphine and prolonged chloroform followed by deep ether anaesthesia, and as the force and frequency of the contractions were really alarming I decided to have the patient moved into hospital, where if the spasm did not relax within a reasonable time the operation of Caesarean section would be available.

The patient was not allowed to regain consciousness, but was kept quiet with chloroform until shortly before her arrival at hospital about one and a half hours later, when the supply gave out. As the ambulance drew up at the hospital door the child was born spontaneously—a healthy boy weighing 9 lb.

The subsequent history was uneventful; the patient was up and out on the eleventh day.

Remarks.

There are a few points in the case which I think deserve emphasis:

As regards the suggestion that the condition was habitual, one case has been reported where the contraction ring recurred at three successive labours in the same patient.

The symptoms are confusing. One does not expect to find a tight contraction ring in a patient who is obviously not threatened with rupture of the uterus, in a patient having a roomy pelvis and carrying a normal child in a normal position. However, it is just under these circumstances, where labour is unwarrantably prolonged, that one should suspect the presence of spasmodic stricture.

The following symptoms struck me as most obvious:

- (a) Contractions very strong, frequent and painful, for a while practically continuous; uterus very tender.
- (b) No distension of lower uterine segment; contraction ring neither visible nor palpable externally.
- (c) The head balloting freely in the pelvic brim, advancing and retiring again with each pain.
- (d) The woman's general condition extremely good.

I have tabulated these symptoms for comparison with those commonly found in obstructed labour with threatened rupture of the uterus, as described by Tweedy.

OBSTRUCTED LABOUR. <i>Retraction Ring.</i>	SPASMODIC STRICTURE. <i>Contraction Ring.</i>
1. Vagina hot, dry, walls swollen, lips oedematous.	1. For some hours vagina remains moist and introitus normal.
2. Vagina ballooned, fornices pulled up.	2. No ballooning nor stretching of fornices.
3. Cervix may be fully dilated and drawn completely up, or may be imprisoned in pelvis, thickened and swollen from oedema and effusion of blood.	3. Cervix flaccid, empty, hanging loose in folds, no signs of pressure.
4. Contractions continuous or almost so, fundus and especially lower uterine segment very tender.	4. Contractions continuous or almost so, very powerful, tenderness marked.
5. Lower uterine segment becomes progressively distended, the child forced down into it, the body of the uterus steadily retracting. Retraction ring mounts higher and higher, the groove being visible and palpable externally.	5. Contraction ring remains at one level. Position of child unaltered. No groove visible or palpable externally.
6. Presenting part high up, fixed.	6. Presenting part high up, un-fixed.
7. No advance of presenting part.	7. Advances with each pain and recedes again at once.
8. General condition poor. Face anxious, pale, sordes round lips, rapid pulse, exhaustion.	8. General condition good for some hours, colour good, pulse good, no sordes. Frantic with un-availing pain.

As regards No. 4 my case differs from the majority of those recorded in these points: that the contractions were very powerful and for a time tonic, and that the uterus was very

tender. Records of other cases state that the uterus has, as a rule, been in a state of inertia and there has been no tenderness. Galabin in 1897 described the spasm in hour-glass uterus in the third stage as analogous to rigid cervix of the first stage, and says that it is always associated with absence of active expulsive pains.

It is possible, then, that there are these two types of spasmodic stricture:

1. Associated with uterine inertia and caused by local irritation; due in part to early rupture of the membranes and manipulations; uterus not tender.
2. Associated with powerful tonic uterine contractions, cause unknown; presumably due to some inherent irritability of the uterine muscle; uterus very tender.

As regards No. 5 there has been some discussion. Clifford White has queried the first entry, saying that neither he nor some of his colleagues had ever felt Bandl's ring per abdomen in a case of obstructed labour. On the other hand, some writers when reporting cases of dystocia due to contraction ring have stated that the ring was externally palpable.

Diagram 1 shows the outline of a uterus during the second stage in normal labour, the three constrictions being of course the upper limit of the lower uterine segment, the internal os, and the external os.

Diagram 2 shows the outline of a uterus during the second stage in obstructed labour with threatened rupture. The vagina, cervix and lower uterine segment are all stretched up and ballooned out to receive a large portion of the foetus. The upper segment has retracted and the retraction or Bandl's ring is well marked.

DIAGRAM 1.

DIAGRAM 2.

DIAGRAM 3.

Diagram 3 shows a uterus during the second stage in a case of spasmodic stricture. The vagina is normal, the free edge of the cervix hangs loose and flaccid, there is no distension or ballooning of any part. In my case the head lay in the lower uterine segment and the upper part of the cervix, firmly held by the neck. The outline of the uterus remained ovoid to palpation and inspection.

I am aware that these diagrams may appear exaggerated, particularly to anyone who has seen the illustrations of those cases in which the uterus was removed entire and afterwards frozen and sectioned. What remained of the contraction ring is seen as a ridge in the uterine wall, so slight that one cannot imagine it to have caused obstruction. This diagram shows the impression conveyed to my mind at the time of intrauterine examination.

Treatment.

It is universally acknowledged that the correct treatment of hour-glass uterus in the third stage of labour, uncomplicated by haemorrhage, is morphine and rest. By analogy, one would suppose that many cases occurring earlier in labour will yield to such treatment, and doubtless this is true, many of such cases passing unrecognized. But there are other cases in which the spasm will not relax under any expectant treatment. A case has been reported which was watched for thirty-six hours without relaxation. Willett has reported a case which only yielded to continuous traction applied for three hours after craniotomy.

Great anxiety attends any intrauterine operation, on behalf both of the child and the mother. Wilhelm, of Missouri, reported six cases treated by manual dilatation. In five of these he turned the child and extracted by the breech. All the children were stillborn. In the sixth case he applied forceps after manual dilatation and extracted the child alive. He states, as a result of this experience, that the foetal mortality is very high, but there is little danger to the mother in manual dilatation and delivery. In this opinion I cannot concur, nor do I find it corroborated by other authorities. I agree rather with Hedley, who says that manual dilatation carries the threefold danger of rupture, shock, and sepsis. There are records of deaths from these causes following manual dilatation. De Lee's opinion is that a uterus in localized or general tetanus will not rupture spontaneously,

but there is considerable danger of tearing the uterus by operation during the spasm.

Incision of the ring per vaginam is too dangerous to be attempted. Version is absolutely contraindicated; it is, moreover, often impossible.

The application of forceps is very rarely helpful. Where the ring is around the child's neck the blades almost invariably slip. If they do succeed in dragging the head down to the vulva it simply carries the ring down with it, unless the latter has been torn in the process. A case has been reported where the ring had formed around the shoulders of the second of twins, and where very gradual traction with forceps caused a tear of the vagina, cervix, and lower uterine segment into the broad ligament. The application of forceps, therefore, is not advisable in the case of a living child. Where the child is dead forceps with cleidotomy and steady traction will doubtless be sometimes successful.

Craniotomy also has but a limited field, even within that class where the child is already dead. Embryotomy has succeeded in a few cases, in others it has been impossible to deliver even after evisceration.

There is no doubt that where the child is dead the ring in the majority of cases will yield to slight steady traction if that part of the foetus endeavouring to enter the ring be cone-shaped. Division of the clavicles will therefore be of use where the shoulders are obstructed. Again, in that case of breech presentation reported by Lady Barrett to which I have already referred, a hydrocephalic head was successfully extracted through the ring after puncture of the spinal canal.

There remains but Caesarean section. Mr. Munro Kerr has said very recently that probably Caesarean section will in future be more frequently performed for the relief of this condition. And it surely is the ideal treatment for obstinate cases if only the uterus be not already infected. Where infection has already occurred the section should be followed by hysterectomy, or, if the child be dead, a hysterectomy alone is indicated.

With regard to treatment I am impressed by the following facts:

1. The difficulty, danger, and high mortality attending active interference.
2. That the only abnormal condition is a localized spasm of the uterine muscle.
3. That deep anaesthesia diminishes muscular spasm.
4. That repeated examinations increase spasm and are therefore contraindicated.
5. That in the case I have reported deep and prolonged anaesthesia alone resulted in the spontaneous delivery of a healthy child.
6. That in the previous confinements of this patient forceps were applied on every occasion, with an infant mortality of 50 per cent.

As a result I consider that the correct treatment for this condition is *deep anaesthesia, if necessary prolonged, and nothing else*. This treatment will, I believe, very nearly eliminate the necessity for Caesarean section.

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RECTAL ADMINISTRATION OF TARTARATED ANTIMONY IN BILHARZIASIS.

BY

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ALTHOUGH a number of papers have appeared recently on the treatment of *Schistoma haematobium* by tartar emetic, the method invariably advocated has been intravenous injection. For any parasitic infection of the general circulation this could hardly be improved upon, as the drug enters the blood stream in such quantities and at such precise times as the introducer desires. But where it is desired to destroy a parasite whose habitat does not generally extend beyond the portal circulation it seems more reasonable to introduce the

parasiticide directly into the radicals of that system, so that it may meet with what it is intended to kill in greater concentration than if injected into a superficial vein and accordingly distributed to all parts of the body before reaching its object.

As, however, accessible veins of the portal circulation are not available for injection, we are thrown back upon the absorbing powers of the rectal mucous membrane, reached by solutions of the tartarated antimony given as small enemata. The drug absorbed in this way enters the superior haemorrhoidal vein, where, in cases with rectal symptoms, the worms are understood to lay their eggs.¹ The free intercommunication between this vein and the vesical plexus allows of the drug passing to the bladder wall, in which oviposition is the rule in cases with haematuria or other vesical symptoms. That part of the dose which does not find its way into the vesical veins passes up to the portal vein itself, where the pairing of the worms takes place, and so reaches the liver, where the younger immature forms are found, and in this way exerts its maximum action upon all stages of the creature's life cycle before being merged into the general circulation, in which worms are only found, Kartulis tells us, in the inferior vena cava; this is the first part to be reached by the antimony.

Whether the portal system can be "sterilized" by the administration of a few large doses in this way, and the treatment reduced to, at most, one or two administrations, must be left for further investigation. The purpose of this preliminary note is to draw attention to the tolerance of the rectum to what would be considered very large doses if given in any other way, and in particular to emphasize the convenience of this method where the personal idiosyncrasy of the patient, or, in women and children, the difficulty of locating and entering a vein, makes the intravenous method undesirable.

Indeed, as an alternative it must always be of practical value to practitioners who, for whatever reason, do not go in for intravenous work, or who find the necessary sterilization of solutions, needles, etc., an undesirable call upon their time, apart from the need for giving an intravenous injection personally. Finally, experience of the high lying plateaux of Central Africa goes to show that, both in the rains and in the cold season which succeeds them, many days are most unsuitable for finding veins in the subcutaneous tissues of naked and shivering patients; at times weeks have passed without days sunny enough to give what may be called "good veins." At such times, when many cases of bilharziasis are waiting treatment, the method advocated here is a real boon.

Four cases only will be cited to illustrate the possibilities of intrarectal treatment.

CASE I.—Child with Old-standing Bilharzia Infection of the Bladder Cured after Fourteen Intrarectal Injections.

John, a half-caste boy aged about 7, who had come up country from Southern Rhodesia, eighteen months before, complained of suprapubic pain and of passing blood at the end of micturition; these symptoms were of some four or five months' duration. There was a history of a streak of blood in the stool, which had defied treatment for some time, but at that time no search seems to have been made for schistosoma eggs in the faeces. Examination of uncentrifugized specimen of urine revealed terminal spined ova in astonishing numbers; the specimen was red and loaded with urates. No eggs were found in faeces. Treatment was commenced with an injection of 1 grain in 100 c.cm. of water at body temperature. A few drops of tincture of opium were added, but as there was no intolerance this was not repeated. Two days later a dose of 2 grains was given in the same way, and thereafter for three weeks the drug was given every second day in gradually increasing doses—2 grains, 3 grains, 4 grains, 5 grains, etc. During the first week the urine cleared of blood, but after eleven doses a few shrivelled eggs were still to be seen. The 12-grain dose was repeated twice, and two days later 14 grains were given, after which no sign of an egg was found on examining the last part of a specimen passed in the morning on rising and centrifugalizing the sediment after some hours' standing. At no time in the course of treatment did the boy show any sign of nausea, nor were his appetite or spirits in any way affected. He received in all 104 grains.

CASE II.—Child with Enlargement of Liver, Ascites and Anaemia: Schistosoma Ova in Faeces: Cured after Fourteen Injections.

Simiyon, a boy of perhaps 6, was brought in with a much-distended belly, containing a quantity of free fluid; the liver was two fingerbreadths below the costal margin. The boy was anaemic and listless.

Examination of the faeces showed numbers of ova, chiefly lateral-spined in type. He was treated *pari passu* with Case I, and in the same doses up to 12 grains; this was then followed by one of 16 grains. No eggs were found thereafter; the abdomen had decreased in size so as to be no larger than that of the run of native children of his age, and although the liver was still easily palpable