A British Medical Association Lecture

ON

DIFFICULT LABOUR.*

BY

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EVERYONE with obstetrical experience will agree that the commonest cause of difficulty in labour is the occipito-posterior position of the vertex. Probably the second most frequent cause is breech presentation.

OCCIPITO-POSTERIOR PRESENTATIONS.

Considering how small is the deviation from the normal, the amount of trouble and worry which occipito-posterior positions cause is astonishing. Difficulty, of course, arises mostly in those cases in which the occiput fails to rotate spontaneously to the front, and this is due mainly to a lack of complete flexion of the head. It is elementary knowledge that an imperfectly flexed head throws larger diameters across the pelvis than a completely flexed one, and in the case of occipito-posterior positions this results in, first, late engagement of the head at the brim of the pelvis; secondly, a tendency to arrest and impaction of the head when it is in the cavity; and thirdly, great difficulty in the birth of the head, face to pubes.

The late engagement or arrest of the head at the brim, which occurs in some occipito-posterior cases, is largely due to the wide posterior part of the head trying to get into the pelvis through the sacro-cotyloid diameter, which is rather small for it. An important corollary is that this arrest of the posterior part of the head tends to a still further undoing of flexion and a consequent increase in the antero-posterior measurements of the head thrown across the pelvis. The degree of misfit which is thus present between the presenting part and the brim of the pelvis may lead to the membranes protruding through the partially opened os in a sausage shape; and, as always, such membranes are peculiarly liable to early rupture. Cases, therefore, in which there is considerable arrest of the head at the brim of the pelvis are often further complicated by the labour becoming a dry one. The result in such cases is a prolonged and painful first stage, dragging on hour after hour and it may be day after day, with intervals during which the pains, in some cases never properly efficient or regular owing to the lack of proper pressure by the head and the bag of membranes upon the region of the internal os, tend to cease altogether.

In time, however, the cervix becomes completely dilated and the moulded head slowly passes down through the pelvis, delay being experienced throughout, owing to the large diameters of the head. The crucial point is when the head reaches the pelvic floor. Where the flexion has been complete and the first stage more or less normal, the occiput rotates to the front without any great difficulty, but in the cases which we are considering, where flexion is imperfect, there is often great delay in the occurrence of rotation. In many cases the head remains in the oblique diameter of the pelvis simply because the uterus has become too exhausted to cause rotation; in other cases the deflexed head becomes impacted upon the ischial spines, while in still others, in which the degree of deflexion is even more marked, the sinciput becomes the leading part of the head, and is rotated to the front, while the occiput slips into the hollow of the sacrum. Delivery with the head in this position involves the passage through the outlet of the pelvis of diameters which are probably from a half to three-quarters of an inch longer than in a normal labour, with the consequence that great force must be exercised either by the uterus or by the forceps, and that a deep tear of the perineum is almost inevitable. All of us have experienced cases illustrating difficulty at any or all of the stages I have mentioned, but it may be helpful to consider them calmly in an atmosphere more judicious than the lying-in chamber.

Diagnosis.

Before making any remarks with regard to treatment I must refer to diagnosis, because every year's increasing experience has brought it home to me that failure to recognize the occipito-posterior position is a more fruitful source of worry and suffering and disappointment than almost any other diagnostic error in midwifery practice.

Ante-natal examination will, in most cases, reveal the occipito-posterior position. The method of examination is abdominal and depends in the main upon failure to recognize the continuous resistance of the back running down the front of the uterus on one or other side of the middle line. Secondly, the small parts of the foetus are palpable with ease on both sides of the middle line. Thirdly, the trunk of the child may be felt well round to one or other flank, usually the right. Fourthly, the foetal heart is best heard well round to the flank, but may sometimes be heard also anteriorly on the opposite side of the abdomen. This last is a point of importance, as it indicates that the child is lying with its spine straightened and its chest thrown forwards, and this implies a degree of undoing of the flexion of the head.

Owing to the difficulty which the head, especially if incompletely flexed, may have in entering the brim of the pelvis, it tends to remain movable above the brim, even in a primigravida, until the commencement of labour. Failure of the head to engage in the brim of the pelvis at least a fortnight before labour in a primigravida woman should always make one think hard, and lead, if necessary, to revision of the pelvic measurements; but if these are quite satisfactory, then the posterior position of the head is enough to account for the failure to engage. Up to about five or six weeks before full time the child may quite readily change its position spontaneously, and come to lie occipito-anterior; but it rarely changes within the last fortnight, indeed comparatively seldom within the last month, and I think that cases of occipito-posterior position diagnosed in the later weeks should be treated by an effort to correct the position.

The only method that I know which affords any prospect of success is the one described by Dr. R. C. Buist of Dundee. The patient is asked to come back, bringing with her two pillow-slips and a bolster-slip. One pillow-slip is folded into a firm cylindrical pad or roller, which is then placed on the right flank (I am assuming a right occipito-posterior position in this case), in order to press the anterior shoulder of the child towards the middle line. The other pillow-slip is folded in four and placed as a firm pad on the left side of the lower abdomen to press back the limbs of the child, while the bolster-slip is fixed as a firm abdominal binder to keep the pads in position. The patient is then told to go home, to rest as much as possible during the next forty-eight hours, and to take a dose of castor-oil the morning after the pads have been applied. In a series of close upon a hundred cases, regarding which careful notes were taken in our ante-natal department, Haultain¹ found that the occiput rotated to the front in rather over 80 per cent. Once it has come round to the front the head tends to engage, especially if a firm binder be kept in position to press it into the pelvis, and relapse cannot occur. After the head has begun to engage with the occiput posterior, any attempt to rotate it by means of pads is, of course, useless, and the first stage of labour must be allowed to complete itself before any question of intervention arises.

During labour the diagnosis can again be made by the abdominal method, but an aseptic vaginal examination will further confirm it. The main point here is the recognition of the anterior fontanelle lying to the front, and it is important to try to feel also the posterior fontanelle, usually pretty high up in one or other posterior quadrant of the pelvis, and to attempt to assess the relative levels of the two fontanelles. This gives one an idea of the degree of flexion of the head. If, at the end of the first stage, there is still any doubt as to the exact position of the head, the point can be settled beyond all question by feeling the ear of the child. The one or two fingers which are sufficient to make the vaginal examination in a normal case are quite inadequate in an abnormal case. The secret of correct diagnosis in all cases of difficult labour is

* Abstract of a lecture delivered before the Blackburn Division on February 27th.

"chloroform and the whole hand." Under anaesthesia, and with aseptic precautions, the hand is slipped up the side of the head until the ear is felt, and when it is flattened out on the head, the pinna points towards the occiput. The importance of this method of diagnosis is very great, because, as I have already indicated, so many disasters result from allowing the case to drift on without the attendant having an accurate knowledge of the position of the head, and therefore of the real cause of the delay.

Difficulties are likely to be encountered only where the head is imperfectly flexed; if, therefore, we can at a comparatively early stage recognize that we are dealing not merely with an occipito-posterior presentation, but with an imperfectly flexed head, then we are in a position to consider whether or not early intervention is advisable. Signs which point significantly to imperfect flexion are, first, delay in the engagement of the head; secondly, sausage-shaped membranes; thirdly, rupture of the membranes early in the first stage; fourthly, ability to hear the foetal heart through the chest of the child; and fifthly, the anterior fontanelle lying on a lower level than the posterior, as felt by vaginal examination. Look at this table, based upon an analysis by Miller² of over 750 cases of occipito-posterior positions in our hospital work in Edinburgh.

Signs of Imperfect Flexion.	No. of Cases in which Noted.	Termination.	
		Malrotation or Non-rotation.	Spontaneous Forward Rotation.
Early rupture of membranes ...	197	145 (74 %)	52 (26 %)
Delayed engagement of head ...	139	107 (77 %)	32 (23 %)
Foetal heart heard anteriorly as well as in flank	103	78 (76 %)	25 (24 %)
Two or more of above signs noted	141	81 %	19 %
Normal engagement, and rupture of membranes near full dilatation of os. Heart not heard in front	332	33 (10 %)	299 (90 %)

The moral to be drawn from this table is that if we can definitely recognize a lack of complete flexion from the presence of two or more indications we may justifiably and advantageously intervene early, in the interests of both mother and child; experience tends to show that when intervention has to be undertaken late in labour both patients are more exhausted, and the actual intervention itself is more difficult.

Management.

I am no advocate of unnecessary intervention in labour—very much the contrary, indeed. In the great majority of occipito-posterior cases the occiput will rotate to the front, if given sufficient time; it is only where one has definite evidence that in a given case the head is so deflexed that it will probably not rotate spontaneously to the front that I think one should intervene early. Such cases will probably form only from 10 to 20 per cent. of all occipito-posterior presentations. The method of intervention indicated is manual rotation, and with the head at the brim this is an easy operation. It is important to visualize exactly what we propose to do before the hand is introduced, just as in a case of internal version. Without this precaution, we may find ourselves attempting the operation in a strained attitude or with the hand which is obviously less convenient than the other hand would have been. It is important to try also to rotate the body of the child by external manipulation, and this can be helped in many cases by grasping the anterior shoulder between the tips of the first and second fingers *in utero*, while the palm of the hand is spread over the side of the child's head, and actually produces rotation of the head. Some authors have, I think, exaggerated the risk of rotating the child's head without the rotation of the shoulders. The child's neck is capable of rotation without injury to an extent considerably beyond the capacity of the adult, and I have again and again rotated the head without succeeding in

rotating the body, and the child has been in no way affected. At the same time, it is certainly desirable to make every effort to rotate the shoulders, and there is a greater likelihood of the head going back to its original position if the shoulders are not turned.

When we come to the question of the arrest of the head on the floor of the pelvis we have to decide whether to attempt to rotate or to deliver by forceps as a face to pubes case. I confess that I very much prefer rotation to forcible delivery face to pubes; indeed, I think that to deliver a child of normal size as a face to pubes case should be regarded either as a failure in diagnosis or as a confession of failure in efforts to rotate. It is the most undesirable method of all, because it inevitably necessitates undue force and laceration. With regard to the methods of rotation, manual rotation is much safer than forceps rotation. Rotation of the head in the cavity is not, as a rule, a difficult matter. All that is required is that the head should be gently pressed back a little so as to undo any actual impaction; flexed, if possible, so as to throw smaller diameters across the pelvis; and then, if the side of the hand is spread out over the side of the head, a mere movement of rotation of the hand will produce a corresponding rotation of the head. As before, a similar effort should be made to rotate the shoulders by external manipulation through the abdominal wall. Lastly, in this connexion, we must not forget that, although the position is unquestionably the rarest of all, yet the left occipito-posterior position does exist. Therefore, if difficulty is found in trying to rotate the occiput round the right side of the pelvis, an effort should be made to rotate it round the left side before giving up manual rotation as impracticable. Should manual rotation fail, then forceps rotation, provided great care is used to avoid injury to the maternal soft passages as well as to the child's head, is a useful method of treatment. One of the secrets of success is to sweep the handle of the forceps gently and slowly round the arc of a considerable circle, so as to reduce to a minimum the movement of the blades inside the pelvis.

Where rotation has been effected by hand, the head should be well pressed down on to the floor of the pelvis by fundal pressure, and the remainder of the labour either left to nature or shortened by forceps, as circumstances indicate. When the head has been rotated by forceps, then I think that the rest of the delivery should also be conducted instrumentally by the rapid reapplication of the instruments with the blades in their proper position.

In cases where the delivery, for one reason or another, is being conducted face to pubes, and where considerable tearing is likely, I strongly advocate the deliberate incision of the perineum—that is to say, an operation of episiotomy. Personally I prefer to make this incision in a postero-lateral direction, so that any extension of the incision will avoid involvement of the anal sphincter. The subsequent stitching of a clean cut like this is very much easier, and the anatomical restoration of the parts simpler than in an irregular laceration, while the additional room which it gives shortens very materially the later part of the delivery.

BREECH PRESENTATIONS.

The next most common cause of difficult labour is, I think, breech delivery, and an analysis of the complications and difficulties which we have met in recent hospital experience of 233 breech deliveries in three years clearly indicates that the main causes of trouble are the impaction of the breech, especially in cases of frank breech, and, secondly, arrest of the after-coming head, due either to imperfectly dilated passages or to some undoing of the flexion of the head by pulling on the limbs. In these 233 cases we had 8 maternal deaths, but in only one could death be attributed even indirectly to the nature of the labour—a death from septicaemia following impaction at the brim. All the other 7 cases were very seriously complicated by eclampsia (2), concealed accidental haemorrhage (2), acute rheumatic fever, acute pulmonary oedema, and grave cardiac disease with heart failure. The foetal mortality (78) in these 233 cases varied from 3 per cent. in one year to 18 per cent. in another, after complications such as placenta praevia, contracted pelvis, accidental haemorrhage, extreme prematurity, etc., had been deducted.

I am not able to explain the great difference in different years. It may just be a matter of good or bad fortune, but it is quite possible that it is an indication of the skill of the house-surgeon at the time, because it is a well-known fact that the foetal mortality in breech cases depends in considerable measure upon the knowledge, skill, and presence of mind of the obstetrician.

The greatly increased difficulty and danger, especially to the child, in a breech case in a primigravida is so well recognized that we invariably make an effort to correct this malpresentation where it is met with in such patients in the ante-natal department. During the three years in which we dealt with these 233 cases there were to our knowledge an additional 44 cases so averted by external version.

Management of Breech Labour.

With regard to the general management of breech labour I have nothing to say that is in any sense new, but some points in the old and sound teaching may bear repetition. Masterly inactivity in the early stages is unquestionably the keynote of success. My old master, Sir Halliday Croom, used to sum it up in the words, "Hands off the breech," and this certainly may be said to summarize the whole management of a normal breech case up to the birth of the lower limbs. Frank breech cases always tend to give more trouble than those in which the attitude of the child is one of complete flexion. The extended legs act as splints to the trunk and prevent the lateral flexion of the trunk, which is an essential feature in the descent of the breech through the pelvic outlet. Impaction of the breech is therefore very liable to occur when it reaches the pelvic floor, and artificial assistance is often needed. This usually takes the form of bringing down one or sometimes both legs, and the fact that this diminishes the bulk of the breech as it passes through the outlet of the vagina, and that the soft passages are therefore not so completely dilated as they would otherwise have been, leads not infrequently to subsequent difficulty in the birth of the head.

In the 233 breech cases we had 21 cases of frank breech. Artificial assistance of one sort or another was required in 20 of these—that is, in over 95 per cent. The assistance took the form, in most instances, of extraction of the breech after bringing down a leg, and in 7 of these cases an episiotomy was performed in order to give more room for manipulation. No maternal deaths occurred, but 7 stillbirths—that is to say, a foetal mortality of 33 per cent. in this particular set of cases. The cause of death was cerebral haemorrhage in 4 instances, and asphyxia in 2, while one child was dead *in utero* on admission of the mother to hospital.

Treatment of Impaction.

This leads me to speak briefly of the treatment of impaction. If it occurs at the brim, the cause is almost always either the mere bulk of the breech or a contracted pelvis; if it occurs when the breech has reached the pelvic floor, the cause is usually a frank breech. With the breech at the brim, the treatment is to push the breech gently out of the pelvis and to bring down one foot, the foot lying anteriorly by preference. Unless there are definite indications for the rapid completion of the labour it is much safer for both patients to leave Nature to drive the half-breech slowly through the pelvis rather than to proceed immediately to the extraction of the child. To overcome the impaction is usually all that is needed, and intervention at this stage should preferably stop there.

When the impaction occurs at the pelvic floor—due usually to a frank breech—an attempt may be made to hook down the breech by passing the finger into the groin. The breech hook should be used only if the child is dead. No great degree of force can be exercised by the finger or fingers in the groin, and, if we fail, we may sometimes succeed in extraction by the use of forceps; but the grip is not a very satisfactory one, and I do not regard the breech as at all a good indication for the use of forceps. I believe that better results follow if, with the patient in the Sims position, the breech is gently pressed back to the brim and one foot is brought down as before. The risk of doing this is undue stretching of the lower uterine segment, but if the patient is deeply anaesthetized, and if

the manipulation is gently and slowly done, the risk is not great.

When intervention is required for the extraction of the after-coming head or for the bringing down of a displaced arm, the great danger is that the obstetrician may become flurried. It is perfectly true that there is no time to lose, but it is equally true that "the more hurry, the less speed." To be successful the intervention must be carried through exactly according to the book. I say this because, to the man who is anxious and flurried, and who dreads that he is going to have a stillbirth, the temptation to pull, in the hope that with a little extra force he will be able to extract the head, although it may be partially extended, or although one arm or even two may be displaced alongside it, is almost irresistible. The sooner that man realizes that in such an effort he is wasting valuable time and endangering the child's life, and that there is no road to success except the high road, the better for his obstetric practice. Two other small points in this connexion are: first, that no attempt to bring down an arm should be made until the trunk is born as far as the scapula—in other words, the arm must be brought well into the cavity of the pelvis and within reach, otherwise the attempt to get it down will fail; secondly, that in a case where intervention is hindered by a tense perineum, and in all cases of a primigravid breech labour, an episiotomy ought to be made, because the additional room which it gives is an enormous advantage in the necessary manipulations, and in the subsequent birth of the head.

Lastly, the Prague seizure is generally to be condemned as a crude and somewhat brutal method of extraction, in which one has little control over the force exerted. It is not comparable in efficacy with the Mauriceau-Smellie grip with the child astride the forearm and two fingers placed well back over its tongue. The essence of the manœuvre is to produce flexion of the head simultaneously with the extraction, and this can unquestionably be best brought about by the fingers on the tongue pulling down the face, while the occiput is forcibly lifted up against the symphysis pubis in the movement of extraction.

The After-coming Head.

The application of forceps to the after-coming head is a method of treatment which is more ignored than it deserves to be. If the forceps are sterilized and ready, it does not take more than a few moments to apply them to the after-coming head with the trunk and limbs of the child swung well forward and out of the way by an assistant; and there is no question that the forceps give a degree of control over the movements of the head which is greater than that obtained even in the Mauriceau-Smellie manœuvre, while the application of the force to the head and not to the neck is probably safer for the child. I always like to have forceps ready in a breech delivery, and I have found them a most satisfactory means of delivering the after-coming head. Herman described it, without qualification, as "the best treatment where help is needed in the delivery of the after-coming head."

From the figures I have already quoted with regard to stillbirths in frank breech cases, it will be seen that cerebral haemorrhage is one of the commonest causes of death. This exceedingly important observation is based on the incontrovertible evidence of a large series of post-mortem examinations. The haemorrhage is due in most cases to tears in the ligaments of the brain, the falx cerebri, and, in breech cases especially, the tentorium cerebelli, and the injury to these structures is unquestionably due to the fact that in the rapid extraction of the after-coming head the skull is exposed to rapid changes of shape, putting a sudden strain upon its internal structures which they are incapable of sustaining. In a head-first labour the slow moulding of the head allows very considerable changes in the shape of the head to occur without corresponding damage, but this is simply because the moulding forces are applied so slowly. As showing the frequency of these intracranial injuries Holland, in an examination of the bodies of 16 infants delivered by the breech, found such injuries in no fewer than 14, while Heidler, in a recent examination of 99 cases of stillborn breech deliveries, found tears of the tentorium in 68; in

11 he found death to be due to asphyxia, while in the remaining 20 cases the skull was not dissected, so that no actual diagnosis was made. Browne, on the basis of an examination of 200 stillbirths in the Edinburgh Maternity Hospital, showed that cerebral haemorrhage was ten times more common in breech than in vertex cases.

The moral to be drawn from these observations is that intracranial injuries resulting from the rapid extraction of the after-coming head are a considerably greater source of danger to the child than is asphyxia from delay in the birth of the head. It is generally accepted that the foetus can exist for at least ten minutes without receiving fresh supplies of oxygen. Bourne, in his valuable little book, *Recent Advances in Obstetrics and Gynaecology*, refers in this connexion to the apnoeic condition of children born after a prolonged period of "twilight sleep," and who, if left severely alone but merely kept warm, remain motionless for perhaps ten minutes or a quarter of an hour while the heart beats quite regularly, and then quietly and gradually establish respiratory movements. As one who uses "twilight sleep" to a large extent, I have had a great many instances of this, and I can confirm it absolutely. But the application of the matter at present is that it emphasizes the need for care and deliberation in the extraction of the head, and the danger of "hurry."

WHITE ASPHYXIA.

Many of you will have read recently in the *British Medical Journal* a short correspondence which followed a letter by Mr. Bourne in regard to the pallid form of asphyxia—and that is usually the only serious form. With the main burden of Mr. Bourne's letter I am in entire agreement. There is far too much done in the way of violent efforts at resuscitation of the asphyxiated child, and there is no question in my own mind that in many cases the child who is in this condition of suspended animation actually has the flickering spark of life extinguished by these misguided efforts. Clearing out the mucus and liquor amnii from the throat by means of a soft rubber suction tube, warmth to the surface of the body, and a little old brandy on the gums and palate, and in severe cases the intramuscular injection of one or two minims of pituitary extract, have in my experience proved most successful. The main general point to remember is, however, that infants who pass into a condition of white asphyxia are suffering from a condition akin to shock, and should be treated along appropriate lines, warmth and extreme gentleness of handling being the essentials.

REFERENCES.

¹ Haultain: *Trans. Edin. Obstet. Soc.*, lxxxv, 1925-26. ² Miller: *Ibid.*, lxxvi, 1926-27.

THE TREATMENT OF EXOPHTHALMIC GOITRE

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THE controversy which centres around the treatment of exophthalmic goitre is largely due to the fact that patients may get better without treatment. These recoveries are too often attributed to some particular line of treatment, which is then hailed as having the power to effect a cure in a substantial percentage of cases; thus numerous procedures have been advocated, all of which were said to produce good results. Until recently the physician alone showed any interest in the disease, and in his treatment he often adopted a rather fatalistic outlook. He insisted on the removal of all septic foci, advocated a diet in which meat was restricted, advised rest, prescribed sedatives, and if the case was not improved then, the disease had to be left to Nature. Serums, vaccines, and numerous lines of treatment have all been tried, but to-day the most popular remedies are (1) rest combined with iodine, (2) x-ray therapy, (3) operative procedures.

In this paper an attempt is made to compare the results obtained from these three lines of treatment, and in dia-

gnosis, and in estimating improvement or otherwise, I have relied on the basal metabolic rate, the pulse, and the weight; the element of personal bias is thus eliminated and the results are probably rendered more acceptable. In calculating the basal metabolic rate the Douglas bag and Haldane gas analysis apparatus have been used exclusively.

In deciding whether a patient has exophthalmic goitre or not the view is adopted that there must be in every case an increased basal metabolic rate in addition to the usual signs and symptoms. There is a small group of women between the ages of 40 and 45 who show some signs and symptoms of exophthalmic goitre but in whom the basal metabolic rate is not increased; these are therefore not included in my cases. Cases of toxic adenoma are also omitted.

TREATMENT WITH IODINE.

The possibilities which treatment with iodine held out were first appreciated by Marine and Lenhart¹ when they found that the goitre in Graves's disease contained less than the normal amount of iodine. Ten years later Neisser² gave small doses of iodides to patients, and reported good results. These results were supported by the observations of Beebe,³ using small doses of iodine, and by Loewy and Zondek,⁴ who prescribed 3 drops of a 5 per cent. solution of potassium iodide. This they increased to 20 drops three times a day so long as the weight continued to increase.

We owe most of our knowledge to Plummer,⁵ who reported the results of 43 cases in which Lugol's iodine was used; he found that 95 per cent. were benefited. He stated that the basal metabolic rate was considerably reduced, though only temporarily, in most of his cases in about ten days; this was confirmed by Cowell and Mellanby⁶ in this country.

I have observed the effects of iodine in 36 cases, paying special attention to the basal metabolic rate, pulse, and weight. No case is included in which the basal metabolic rate was under +30 per cent., while in the most severe case there was a basal metabolic rate of +114 per cent. In 31 of these cases iodine was being given for the first time, and the drug prescribed was usually Lugol's iodine in doses of 20 to 30 minims a day. In 8 cases the basal metabolic rate and pulse rate were reduced to within normal limits; in 18 other cases there was marked improvement, but the basal metabolic rate and pulse were still raised. In 4 cases there was little or no effect, while in one case the patient became definitely worse, the basal metabolic rate and pulse rate rising from +32 per cent. and 100 to +53 per cent. and 128 respectively. Thus improvement followed the administration of iodine in 84 per cent. of cases. In mild cases with a basal metabolic rate of +20 to +25 per cent. the improvement which followed iodine administration was slight, and it was often difficult to say whether it was the relaxation from mental worry or the iodine which caused the improvement.

In 16 cases the effects of a second course of iodine were observed; these include 11 cases from the first group, on whom the results of a first course of iodine have already been noted. The interval which elapsed between the first and the second course in these 16 cases was variable, and appeared to influence the subsequent action of the drug—the longer the interval the more likely is it that the drug will act a second time; but this is by no means invariable. The length of time that the drug was continued on the first occasion also seems to be important; the longer the course the longer the interval before the drug will act a second time. If the course is a short one there is every likelihood of the drug acting a second time.

The lowest basal metabolic rate among these 16 cases was +33 per cent., while the highest was +75 per cent. In 6 cases the basal metabolic rate and pulse fell considerably at the end of ten days, and the improvement was quite comparable to the result of a first administration of iodine. In 5 cases the improvement was slight, but poor compared to the results of a first course. Three patients died within a month; they were very ill, however, when the iodine was given, and it is not thought that it hastened their deaths. In 2 cases the patients became definitely worse, the basal metabolic rate rising and the weight falling, but in one of these iodine had been of little value at its administration.