Between some of the cases there appears to be a direct connexion.

In one house 2 cases occurred in the course of eight weeks.

In another house 4 cases occurred as follows: One in October, one in June, one in July, one in August. In that house the water supply from a new cistern was suspected, and an anaërobic bacillus was developed from the water; since attention to that no further case has occurred. Although a careful investigation was made, no bacilli were found in the catgut used at any of the four operations. They were all abdominal operations.

In the Royal Victoria Infirmary five abdominal sections were performed by the same surgeon in the course of one morning. The third operation was for gall stones, and the fourth for appendicitis. Both of these patients developed tetanus, and the gall-stone patient died. None of the other 3 cases developed symptoms, although catgut from the same store was used in all the cases.

I have ventured to publish this list of cases, large as it is when viewed as a series of surgical calamities, but small when used for the purpose of generalization, and to make the foregoing remarks, in the hope that others who can throw light upon the subject may be induced to do so.

It is a matter of the most serious nature. Not only is it horrifying to think that a patient should suffer from a deadly disease after a simple operation, such as the radical cure of an inguinal hernia, but it is a matter of the utmost importance that we who used catgut should know whether we will be justified in reverting to its use. It will be a great misfortune if catgut should be proved to be the agent, because it is without any doubt the ideal ligature and suture, having advantages over all other materials. If it is the guilty agent, it would appear as if its use must be discarded altogether, because, judging by the variety and thoroughness of the means which were employed in the sterilization of the catgut in many of these cases, it seems to be impossible to destroy the spores without at the same time ruining the ligature.

The methods were various, and I am unable to give the exact process followed in each case, but in my own cases it was as follows: Raw catgut was wound upon small glass reels and placed in ether for twenty-four hours. From this the spools were transferred to fresh ether for another period of twelve hours. They were then placed in a 1 in 1,000 solution of binoide of mercury in methylated spirit for twenty-four hours, being then transferred to a fresh similar solution, in which they were kept for several days before being used. I had the catgut thus prepared bacteriologically examined on several occasions, and it was always found to be sterile.

In several of the other cases the catgut was prepared by boiling in absolute alcohol at 212° F. for one hour after it had gradually been raised to boiling point.

SUMMARY.

From the foregoing observations I have drawn no conclusion, as they do not appear to justify it, my object in writing this paper being to elicit from others information which may lead to a definite solution; but I would like to give a short summary of the facts and to offer a suggestion.

Hamilton pointed out that there is a group of diseases amongst sheep the symptoms of which are closely allied to tetanus and the bacilli of which cannot be distinguished from those of tetanus.

In these diseases the bacilli are normal inhabitants of the sheep's intestine, but at certain periods of the year they pass from the lumen of the bowel into the blood, where they become bacteriolized, and the liberated toxins give rise to the symptoms of the various diseases.

During these seasons the bacilli are found in the peritoneal cavity and in no other part of the body.

These diseases are endemic in certain parts of the British Isles.

The 21 cases of post-operative tetanus have occurred only in those districts in which the tetanic group of sheep diseases is endemic.

More than 90 per cent. of the cases of post-operative tetanus followed operations in which the peritoneal cavity had been opened.

Bacilli resembling tetanus bacilli have been found in the

remnant of catgut used for ligatures in 4 cases and in the ovarian pedicle in 1 case, but confirmation of the suspicion that those bacilli were tetanus bacilli has not been forthcoming.

The catgut used at these operations was obtained from the same source as that which is used in the South of England and the Eastern Counties.

I would suggest:

1. That the disease which we call post-operative tetanus is not tetanus at all, but one of the sheep diseases.

2. That it is not introduced by the catgut.

3. That the patient is, at the time of the operation, the host of the bacillus.

4. That we must look upon these cases of post-operative tetanus as cases of idiopathic tetanus, accepting Hamilton's suggestion that idiopathic tetanus is not true tetanus as we ordinarily understand the disease. By that I do not assume that these patients would have developed tetanus had no operation been performed. I would rather account for the sequence of events by supposing that the disturbance aroused by the opening of the peritoneum at the operation was of such a nature as to favour the activity of bacilli which, possibly, would have remained dormant, had no operation been performed.

That the mere opening of the abdomen can affect the interaction of a patient and bacilli already present in the peritoneum is frequently demonstrated in cases of tuberculous peritonitis, when a small incision, without any other interference, is followed by immediate improvement of the local condition and ultimate complete recovery.

It may be suggested that the ligatures are infected at or before the time of the operation—that is to say, that post-operative tetanus is the consequence of faulty surgical technique. During the past five years some 350 patients have had loose cartilages removed from the knee-joint, at the Royal Victoria Infirmary, without mishap. This, I believe, is a sure test of the efficiency of any surgical method, and would point to the sterility of the catgut, unless we are to believe that all other germs than tetanus bacilli may be destroyed and yet the latter may remain unaffected.

From such facts and observations as I have brought forward, it will be seen that many questions arise which I am quite unable to answer. As I have said before, this paper is written with the sole object of gathering information. Twenty-one cases are far too small a number to warrant the drawing of any conclusion. For instance, I have failed to find any cases of post-operative tetanus in the South of England, in spite of some diligence, and I have laid some stress on the identical geographical distribution of these cases and the group of sheep diseases, but it may well be that there have been many such cases in the southern counties. If that be so, my argument fails.

In view of the almost universal use of catgut, it appears to me to be a duty to publish my cases, and I hope that others who have had the misfortune to encounter similar experience may be induced to do the same. The problem as to whether the disease is really tetanus is interesting, and suggests many collateral inquiries. That, however, is not a subject with which I am able to deal, it being a matter for bacteriologists. The central point is to find out whether the infection, whatever it may be, is conveyed by the catgut, and I am not without hope that catgut may be acquitted.

FRACTURE OF THE THIGH IN THE NEWBORN.

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CONSIDERABLE interest has lately been aroused in regard to the treatment of fracture of the femur in the newly-born child. Various means are suggested for treating this difficult fracture, but, with the exception of Credé's original method, they are all based on the supposition that both extension and traction are necessary.

Credé recommended binding the limb in a flexed position to the abdomen. Unfortunately, this does not invariably give the best result, and an unsatisfactory union is a difficult thing to rectify. The unsatisfactory cases possibly result from the restlessness of the child, and a heaving abdomen which is sometimes distended

and sometimes relaxed. But the principle of flexion is correct; and the idea is supported by the fact that the newborn child naturally adopts the flexed position for some few weeks after birth, and always sleeps in this posture. On occasions the legs are stretched out, but they always return more or less to the flexed position. It is the child's position *in utero*, and we cannot expect it to alter suddenly. Hence we are right in assuming that flexion is the position of greatest muscular relaxation.

If further proof were necessary, it is to be found in a rapid examination of the fracture under an *x*-ray screen. This must be done very rapidly in a very dark room, for Roentgen rays can do small children no good. With the child in a horizontal position, the thigh is gradually flexed, and the fragments can be seen to come into line and apposition with each other when the limb is all but touching the abdomen. Professor John Cleland, Professor of Anatomy at Glasgow, says that:

When the spinal column is in its natural position in the newly-born, the hip-joint is in full extension when the femur is at right angles to the spinal column. If, then, the thigh be pressed down so as to bring it in a line with the trunk, the change is effected not at the hip-joint, but in the lumbar region by turning the pelvis backwards. This is not a natural position in the newly-born.

He further says:

What happens naturally is up to the time of birth the cervical, thoracic, and lumbar parts of the vertebral column present a continuous concavity forwards.

At birth the head is thrown back and lies naturally on the mother's arm, the cervical convexity thus making appearance. When the child begins to try to walk it throws its pelvis back, and produces the lumbar convexity, and the stretched thigh is thus made to revolve a quarter of a circle or a right angle.

These observations he confirms by anatomical dissection. Surely this supports Credé's flexed position and the view that traction is not necessary. Hence, an apparatus that will keep the fractured limb flexed, and just a little off the abdomen, is all that is necessary.

The accompanying figure illustrates the splint. Roughly speaking, it is shaped like the letters Z O, the latter being attached to the Z at a right angle at the lower right-hand corner. The foot is not included in the splint, which reaches only to the tendo Achillis. A small trough-shaped piece takes the calf, and the trough is continued up the back of the thigh—two-thirds of the way is enough. A small bar clearing the buttock is attached at the upper end to a 2 in. wide loop surrounding the abdomen. The end of this loop or belt is fixed in a slot, so that the diameter can be readily altered. The whole is made of aluminium, and weighs, unpadded, 1½ oz. The splint is best padded with a few layers of lint, soaked in olive oil to prevent contamination, which at the most is but slight. Aluminium is not only very light, but practically pervious to *x* rays, hence the fractured ends can be seen with the splint applied to the limb.

The sound limb, as a rule, is placed by the child in the same position as the fractured. This is an advantage, as one limb supports the other and makes it easier for the mother to hold and nurse the child. In fact, the child can be nursed just like an ordinary child, can be taken out into the open air, and need not be kept in its cot; it may also be taken into bed by the mother at night time. All

cumbersome appliances become unnecessary. When the child is clothed there is nothing to indicate the presence of the splint, and by the mother's arms the slight additional weight passes unnoticed.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TREATMENT OF RHEUMATIC OR RHEUMATOID ARTHRITIS BY RADIANT HEAT AND CATAPHORESIS.

I HAVE no doubt as to the efficacy of the American apparatus, with its 500 candle-power lamp, referred to by Dr. Bailey (p. 13) and by Dr. Gamlen (p. 371), but, like Dr. Gamlen, I am uncertain as to which of the rays it emits one must attribute its superiority, or whether, indeed, such superiority be due to any special rays, or only that by its use free ventilation of the part under treatment is ensured and moist heat avoided. I have often noticed that during its application patients will perspire over the body generally, while the part on which the rays are directed remains dry and becomes red and mottled.

I always employ cataphoresis, but whether its good results are due as much to the introduction of iodine or other ions as to the passage of the current itself I am sceptical. I have used solutions of iodide, usually in the form of KI and have also used solutions of NaCl, and so far I cannot find a marked superiority of the one over the other. Whatever substance be used it is ionized through the skin, but I believe that the portion that reaches the region of lymph channels and blood vessels is at once swept away into the general system; and I question, in the case of a given joint, when two electrodes, moistened with the solution which it is desired to introduce by ionization, are placed one on either side of the joint, and the necessary current passed, whether the ions thus introduced directly reach the joint itself, or, even if some do find their way there, whether their number is sufficient to have a therapeutical effect. I grant that they get into the circulation, but that is not the point.

This is no place to discuss at length the action of a constant current on living tissue. Suffice it to say that there is an alteration of metabolism and an improvement in nutrition, and it is this very condition of malnutrition that we are trying to combat.

I believe that in a large number of cases the joint changes are due to a trophoneurosis set up by an absorption of toxins from the alimentary tract. I therefore endeavour to put my patients on a suitable diet and course of medicinal remedies such as will tend towards the maximum of nutrition and the correction of any gouty or other tendencies, and I further order a systematic lavage of the large bowel on the Plombières system.

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LOSS OF HAIR IN EXOPHTHALMIC GOÏTRE.

ONE of the symptoms of exophthalmic goitre which is little mentioned is the loss of hair. If patients are carefully questioned on this point, I think it will be found in most cases, particularly in women, that this symptom is present. That has been my experience. One case in particular, of which I have the notes, was instructive:

The patient, a young lady about 28, complained of "palpitation" and weakness. She was anaemic, and a haemic murmur was recognized at the base of the heart. The thyroid was not enlarged, and there were no nervous symptoms. Under tonic treatment she recovered.

About two years afterwards the patient consulted me again, her chief trouble being loss of hair, which was going on rapidly. She complained of being easily upset and worried, and attributed this to the alopecia. Although anaemic she otherwise felt well. Both appetite and digestion were good, and she slept well. She was able to bicycle, but of late palpitation of the heart had made this difficult. She had been under medical treatment, but neither iron tonics nor local applications to the hair had done any good. I asked if any enlargement in her neck had been detected, and was told it had not. One medical man, whose name was mentioned, I feel sure would have certainly diagnosed the disease had the thyroid been enlarged or the other symptoms been present when he saw the case.

When I examined the patient the right lobe of the gland was increased in size, the eyeballs were slightly prominent, and