of relief only by operation, and though internal strangulation may be palliated by enterostomy, none of them can be cured except by laparotomy. I think, then, that the opinion of the surgical world will be unanimous in saying that such cases should be treated in that manner; and, if so, it follows as a matter of course that the operation should be performed at the earliest moment possible, since peritonitis comes on with extreme rapidity, and very soon the condition will be hopeless.

Again, there are other conditions which perhaps can hardly be said to be necessarily fatal, but which are so dangerous to life that they may be practically regarded as incurable without operation. This may be said of acute diffused peritonitis from perforation of the appendix, and of subphrenic cavity from gastric or duodenal perforation. Here, again, it seems to me hardly to admit of argument that laparotomy is urgently indicated; and we have had ample evidence that the fatal results of delay are only a little less rapid in this than in the former class.

Another category may be formed of cases which admit, indeed, of cure by laparotomy, but not without great risk, and which are not necessarily fatal, at any rate for the moment. I speak of idiopathic and tuberculous peritonitis, of intussusception, of obstruction from kink or volvulus and of internal stricture. The nearer these latter approach to total stoppage or strangulation the more urgent is the indication to operate; but surgical opinion, and perhaps medical opinion to a still greater extent, is as yet divided as to the propriety of early interference in such cases, though it is impossible to doubt that if relief is not obtained by medical and mechanical treatment the delay will seriously prejudice the chance of success by laparotomy.

Next we have cases of hydatid cysts, of pancreatic cyst, of other non-cancerous tumours, and of limited abscess in the abdominal cavity. The danger that such tumours will make their way into the general cavity of the peritoneum is very great, the patient's prospect of recovery is very much diminished if diffuse peritonitis has been thus set up, and the treatment by laparotomy is so very successful if undertaken before this has occurred, that I cannot myself doubt that early operation is a duty.

In cases of cancerous tumour or stricture it is doubtful whether the total excision of the tumour or of the viscus affected is worth its risks; but it is often possible to maintain nutrition and so preserve life by some "short circuiting" operation, of which gastro-jejunostomy is the most familiar example.

Finally, there are the cases of cholecystotomy and other operations on the gall bladder, operations performed on the ordinary surgical indications, for relief of pain and deliverance from future danger; and, as it seems, with no more than the usual risk and no less than the usual guarantee against recurrence.

If, however, it is so important in many cases to save hours, even minutes, of delay, are our hospital arrangements the best calculated to secure this end? Some surgeons have suggested that in cases requiring laparotomy "consultants should pass a self-denying ordinance, and leave the operation in the hands of the general practitioner." I cannot too strongly dissent from this suggestion. Delay involves great dangers, doubtless; but these operations are among the most difficult in surgery, and require, as Senn³ has most truly said, that he who undertakes them should be "no tiro in surgery;" and the diagnosis requires also "no tiro in physic." That an operation can be better decided on and better performed at the hospital than at the patient's house, seems to me undeniable; and we may hope that as the fatal effects of loss of time become better understood the patients may be sent in earlier. Excluding traumatic cases, they should, I think, be still, as before, physicians' patients, but the house-physician might be instructed to send for both physician and surgeon immediately on the patient's admission, so that the consultation could be held without any further loss of time, and the operation performed, if necessary, on the spot.

If I were still in the active pursuit of operative surgery, and had thus taken a part in the noble surgical exploits about which I have been speaking, I should have become familiar with the details on which the success of these opera-

tions so much depends, and which have been so greatly modified of late, and so much improved. But alas! my most recent experience of laparotomy is nearly eight years old, and the whole proceeding has been revolutionised in that time. I cannot therefore speak with any authority on that subject; nor is it necessary. Treating of laparotomy for diffuse septic peritonitis, Mr. Lockwood (in the current volume of the *Med. Roy. and Chir. Trans.*) has given what seem to me admirable directions for the details of such cases. He has treated of the methods of stimulating the patient and combating the collapse before operation by subcutaneous injections and by alcoholic enemata, of the application of local warmth during the operation, of the kind of anæsthetic to use, of the necessity in some cases for evacuating the contents of the distended and semi-paralysed bowel by incision, and suturing the intestine (of which I have given you two instances from Mr. Sheild's practice), of the great assistance which is often found in these operations from a stout suture passed through the abdominal parietes on each side to hold the incision open, and avoid the embarrassment of retractors, a device for which we are indebted to Mr. Sheild; to the order in which the search should be conducted through the intestinal contents in seeking for perforation or obstruction; to the method of protecting the intestines, which have to be withdrawn out of the abdominal cavity; to the method of washing out the peritoneum, and carefully separating the adherent intestines; to the union and drainage of the wound, the care of the patient during the operation, and his treatment and feeding afterwards. Certainly the perusal of Mr. Lockwood's paper will lead all readers to agree with Senn that these operations are not the part of a "tiro in surgery;" while both the accessories of the operation, and the requisites for after-treatment, require the best resources of a great establishment, where every means of treatment is ready, and there are plenty of skilled persons to apply them.

The only matter which did not come within the scope of Mr. Lockwood's paper, as far as I can see, is the method of intestinal resection and suture; but this I do not venture to treat of. Operating surgeons alone are competent to judge of the value of the various contrivances recently introduced for obtaining safety in removing portions of irretrievably damaged bowel, and speed combined with security of adaptation in the reunion of its divided parts; and the time has not yet been sufficient for any consensus of opinion on the subject.

NOTES ON THE LIMERICK FOOD POISONING CASES.

By SIR CHARLES A. CAMERON, F.R.C.S.I.,

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THE following brief account of this sad case may interest the readers of the *BRITISH MEDICAL JOURNAL*: On July 3rd, 1895, about 70 inmates of a convent and boarding school in Limerick became very ill after dinner, and for several days suffered from vomiting and purging of a severe character. Three ladies died, and many of the other inmates were for several days in a precarious condition. Poison being suspected, portions of the vomit and dejecta were sent to me for examination on July 5th; also a portion of cornflour which it was suspected might contain poison—but none was found in it, nor in the other matters sent to me. Suspecting the case to be one of ptomaine poisoning, I telegraphed for portions of everything the patients had for dinner; but the only items available were sugar and sodium bicarbonate, both of which were pure. It has been clearly ascertained that the poison was not in the meat used, for some persons who had partaken of it were not ill, and the history of the carcass that furnished it was made out and negatived the hypothesis of unsoundness or disease in it. It appears that a custard formed part of the dinner, and that all who partook of it sickened. The cook (one of the sufferers) states that she prepared the custard as follows:

Tuesday, July 2nd, I took 4 quarts of skimmed milk of previous night, boiled it, added about $\frac{1}{2}$ lb. loaf sugar, added 2 tablespoonfuls of cornflour, and boiled again; this was done in a tin vessel. At 3 or 4 P.M. resumed making of custard: Beat up 8 or 10 eggs, all fresh except one,

³ *Intestinal Surgery*, p. 31, edition, 1889.

which had a reddish-brown colour but no bad smell; poured them into the milk, which was then about the temperature of tea, and then poured it into an earthenware bowl; removed to a cold place during the night. On Wednesday, July 3rd, 9 A.M., the custard had become quite thin, of the consistence of cream. Poured it over 7 or 8 quarts of strawberries, about 1½ quart of which had been gathered on the previous night. Whipped the whites of eggs used above with 1 lb. of sifted sugar and spread over strawberries and custard on glass dishes.

That the strawberries were the cause of the illness is negatived by the fact that three or four persons who used gooseberries and not strawberries with the custard were amongst the sufferers.

The inquiry is therefore narrowed to the question, Was the *matieres morbi* in the milk or eggs? It would seem that some surprise was manifested by the custard remaining thin. When I first heard this fact I thought that the fluidity might be due to the liquefying influence which certain bacilli have on gelatine and albuminous matters, though the rapidity of their action in this particular case seemed surprising. I therefore had a custard made similarly to that described by the cook, and found that it remained as thin as rather thin cream. This want of consistency was, however, due to the albumin of the eggs not having been coagulated by heat, for when my custard was heated to near the boiling point (as should always be done) it became on cooling quite thick. That a highly poisonous substance (tyrotoxin) is generated in milk, not necessarily very stale, is well known. In the Limerick case the milk was at least two days old when consumed, as at 11 o'clock on the previous day it was skim milk of "the previous night." It was however boiled, and, after the addition of cornflour and sugar, again boiled.

The question is, could the milk in presence of sugar and cornflour have generated tyrotoxin from the time it was boiled at 11 o'clock on Tuesday until it was produced at dinner at 1 o'clock on Wednesday. The time of year was favourable to the fermentation of the unstable mixture. Suspicion falls stronger on the eggs. I have learned that they were market eggs and had been purchased four or five days before they were used. Though not putrid they were more or less stale, and one had a curious colour, described by one person as resembling that of claret. Now, after the addition of the eggs to the luke-warm milk, sugar, and cornflour, there was no further heating, and it is clear that the egg albumen was not coagulated. There is reason to believe that the discoloured egg was cracked and, if so, micro-organisms had access to its interior. The viscera of two of the ladies who succumbed to the attack were examined for ordinary poisons with negative results, but a substance was extracted from them which gave all the characteristic reactions of ptomaines. The quantity available for examination was altogether insufficient to differentiate the ptomaine or ptomaines present from others, of which there seem to be a very large number. I am not aware that in any case of ptomaine poisoning the ptomaine was extracted from the viscera and identified.

Another patient died on July 16th, thirteen days after partaking of the custard. The inquest was held same day, and the verdict given was in accordance with my evidence.

In this case it is much to be regretted that neither the custard nor the matter ejected from the patients on the first or even second day of their illness was available for bacteriological and chemical examination.

A case of poisoning from stale eggs is recorded by Dr. Marshall in the *Gazette Médicale de Paris*, 1839.

OBSERVATIONS ON THE ACTION OF THE LEE METFORD BULLET ON BONE AND SOFT TISSUES IN THE HUMAN BODY,

MADE DURING THE CHITRAL EXPEDITION.

BY SURGEON-LIEUTENANT JAY GOULD,
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AFTER the actions of Malakhand Pass, Khar, and Swat River, Major-General Alexander A. A. Kinloch, C.B., kindly allowed me to go into the surrounding villages, collect and treat Swatis wounded by the magazine rifle. After overcoming the suspicions of these tribesmen, I succeeded in

collecting some twenty-five or thirty cases, and herewith attach short notes of the most interesting of them:

CASE I.—A male, aged 25. The entrance wound was small, the edges cleanly cut and very slightly inverted. It was situated 2 inches below and behind the right great trochanter, and passed obliquely upwards and to the left through the sacrum. The wound of exit, above and behind the left great trochanter, was very little bigger than the wound of entrance; its edges slightly everted, but not lacerated. The sacrum was simply drilled; the bones were neither fractured nor splintered, the muscles and other soft tissues were apparently little damaged. With free drainage and the usual antiseptic precautions the patient rapidly recovered, and in about three weeks was ready to fight again.

CASE II.—A male, aged 18. The entrance wound was behind the internal condyle of the right arm. It was small, the edges cleanly cut and slightly inverted. It passed obliquely downwards and outwards through the olecranon and the upper part of the shaft of the ulna. The exit wound was 2 inches below the tip of the olecranon and half an inch to the outer side of the posterior border of the ulna. The olecranon was pierced obliquely, no fracture could be made out, and only very slight splintering of the bone. The damage to the soft tissues was trifling. Rapid recovery took place, with good movement of the elbow.

CASE III.—A male, aged 27. The wound of entrance was in the middle third of the inner aspect of the right thigh. It was small, the edges cleanly cut, and there was little inversion. It passed obliquely downwards and outwards through the extensor muscles, grooving slightly the front of the shaft of the femur. The exit wound was at the outer aspect of the thigh in the upper part of the lower third. The bone was not fractured, but a small amount of bone was removed in very small pieces. The recovery of the patient was rapid.

CASE IV.—A Mullah, aged 45. The entrance wound, small and sharply cut, was situated in the left submaxillary region, about the level of the hyoid. It coursed upwards and to the right, through the lower border and horizontal ramus of the lower jaw of the right side. The wound of exit in the lower part of the cheek was a little bigger than that of entrance and slightly everted, but its edges were not lacerated. The bone was not fractured, but the lower border was splintered, though not to any great extent; some small fragments were removed. The teeth were intact. The injury to the soft tissues was slight.

CASE V.—A male, aged 18. The entrance wound was 2 inches above the external condyle of the left arm; the exit wound exactly opposite on the inner aspect of the arm. Both entrance and exit wounds were small, and there was no laceration of skin. The bone was drilled, but not fractured or splintered. Recovery was rapid, the wounds being perfectly healed in fifteen days.

CASE VI.—A male, aged 35. The entrance wound was behind the surgical neck of the humerus. It passed backwards and towards the vertebral column, passing the axillary border of the scapula, and coming out over the centre of the infrapinnous fossa. The injury to the bone was slight. No splintering could be made out. The damage to the soft tissues was trifling. Recovery was rapid.

CASE VII.—A male, aged 20. The entrance wound in the upper third of the right forearm passed directly backwards through and to the outer side of the radius. The exit wound was opposite, on the posterior aspect of the forearm. Both entrance and exit wounds were small and sharply cut. The bone was not fractured, but slightly splintered, and several small pieces were removed. The damage to the soft tissues was slight. Recovery was rapid.

CASE VIII.—A male, aged 32. The entrance wound was at the anterior and inner aspect of the upper third of the right thigh; that of exit at the centre of the posterior aspect of the thigh 2 inches below the gluteal fold. Both wounds were sharply cut. There was no laceration or ecchymosis of the skin, and the damage to the soft tissues was slight. The bone was uninjured. Recovery was rapid.

CASE IX.—A male, aged 40. The entrance wound at the middle of the right forearm was small, the edges sharply cut, and slightly inverted. It passed directly backwards through the ulna. That of exit, on the posterior aspect of the fore-