4. The effects of these micrococci on rabbits and man were not similar, some of the most virulent forms for rabbits causing no deleterious effect in wounds in man.

5. The kidney is apparently an important excreting organ for organisms.

6. Organisms not capable of growing in the blood may yet cause serious effects by growing in the excretory canals. This may explain some cases of pyelitis.

7. Where an organism is not markedly pathogenic, it may be necessary to introduce a large quantity before morbid changes are set up.

8. Suppuration is not always due to micrococci; it may be caused by chemical irritants, such as croton-oil.

9. Micrococci are always present in acute abscesses, and are probably the cause of them.

10. In some cases, the micrococci are the primary cause of the inflammation and suppuration, as in pyæmic abscesses; generally, however, they begin to act after inflammation has been previously induced.

11. This inflammation may be caused by an injury, by the absorption of chemically irritating substances from wounds, by cold, etc.

12. There are several different kinds of micrococci associated with suppuration.

13. Micrococci cause suppuration by the production of a chemically irritating substance, which, if applied to the tissues in a concentrated form, causes necrosis of the tissue, but, if more dilute, causes inflammation and suppuration.

14. The conditions in wounds and abscesses are not the same, inasmuch as in the former there is opportunity for mechanical and chemical irritants to work.

15. There is no reason for denying the existence of "antiseptic suppuration."

16. Tension may also cause suppuration, but it is perhaps most frequently aided by the growth of micrococci. These organisms need not be of a very virulent kind. It is also probable that the products of inflammation are themselves irritating and capable of exciting or keeping up inflammation.

17. The micro-organisms of septicæmia, of pyæmia, and erysipelas, are different from one another and from those of abscesses. In erysipelas, the micrococci grow in the lymphatic spaces. In pyæmia, they grow in the blood to form colonies and emboli. In septicæmia, they may only grow locally, the symptoms being due to the absorption of their ptomaines; or if they grow in the blood they do not form colonies and emboli. Septicæmia may also be due to other organisms besides micrococci.

18. There are no facts to support the view that it is the same micrococcus which, under different conditions, causes these various diseases. The experiments of conversion of innocent into malignant forms, and *vice versa*, are unreliable.

ERRATA.—In the first part, page 556, Series III, Table B, seventh line, instead of "m1" read "m15." In the second part, page 600, Series IV, Table C, under "Result," first and second lines, leave out "Microscopic appearances." Page 602, in description of Fig. 8, read "In the corner," etc. In the same page, the sixth line from the top has become displaced, and ought to come before the fourth line. The two sentences read as follows: "Where this necrosis is complete in the immediate vicinity of the mass, the epithelium of the tubules, and indeed all the tissue around, remains unstained and partially invisible. I have, however, after careful study of numerous sections, convinced myself that by far the greater majority of the masses are in the urinary tubules."

Dr. Koch has declined an invitation to Leipsic University as successor to the late Professor Cohnheim.

AMBULANCE CLASSES.—A class at Parkhurst Prison, Isle of Wight, instructed by Dr. Arthur Price, has undergone examination by Surgeon-Major V. Wearne, A.M.D., and the governor (Major F. H. Noot) and 17 warders have been reported to St. John's Gate as thoroughly competent to render "first aid to the injured." The Countess of Strathmore presented 358 certificates to the Dundee classes on Friday, and Lord Egerton of Tatton presided at Stockport, on Saturday, to open the ensuing session.

DONATIONS AND BEQUESTS.—Her Majesty the Queen has given £100 to King's College Hospital.—University College Hospital has received £150 towards the endowment of "Harriett-Henley Cot," and fifty guineas from Lady Goldsmid.—The Royal Hospital for Incurables, Putney, has received £60, "being the residue of £100 that was set apart for the funeral of the dear departed one."—Mr. James Anderson, of Worseley, has bequeathed £400 to the Royal Infirmary, Edinburgh, £350 to the Manchester and Salford Saturday and Sunday Hospital Fund, and £350 to the Devonshire Hospital, Buxton.—Miss Martha Butler, of Bath, has bequeathed £200 to the Bath United Hospital.

BRITISH MEDICAL ASSOCIATION.

FIFTY-SECOND ANNUAL MEETING.

PROCEEDINGS OF SECTIONS.

GASTROSTOMY FOR STRICTURE OF THE ŒSOPHAGUS.

Read in the Section of Surgery.

By JOHN FAGAN, F.R.C.S.I.,

Surgeon to the Royal Hospital, Belfast.

I QUESTION if, among the many painful cases it falls to the lot of the surgeon to deal with, there is any that gives him more anxious concern than one of stricture of the œsophagus. Putting aside the congenital and nervous forms of this affection, we have now only to deal with the organic. This may be of a simple or a malignant character.

If there be no history of injury sustained, and we can exclude tumours formed outside the tube, it is a most difficult matter to decide whether the obstruction be of a malignant or fibrous nature; in its earliest manifestations, it is almost impossible. In several cases lately operated on, as reported in the journals, where the clinical features pointed to malignancy, the *post mortem* examination revealed them to be simple fibrous stricture, and *vice versa*. I believe cases of simple fibrous stricture, without any history of previous injury, are of more frequent occurrence than is generally supposed; the wasted, worn aspect produced by inanition gives the patient a cachectic look, and thus inclines one to the opinion that the affection is malignant.

When the obstruction has existed for a considerable period—say from nine to twelve months—and has evenly, almost imperceptibly, increased, and when there are no physical signs of malignancy present, the case is more than likely one of simple fibrous stricture. On the other hand, although all the physical signs of malignancy be absent, if the dysphagia suddenly manifests itself in a marked degree, and after this the patient rapidly loses flesh, the case is almost sure to be one of malignant stricture.

I will now briefly narrate the leading features in the histories of two cases of stricture of the œsophagus, for the relief of which I performed gastrostomy.

CASE I.—J. P., aged 46, was admitted into the Royal Hospital in July 1883. Eight months previously, his trouble began in the form of dyspeptic symptoms. During that time, he lost two and a half stones in weight, and became very emaciated and debilitated. The dysphagia slowly increased, till complete obstruction occurred at the time of his admission.

He was placed under the care of a physician, and was supported by enemata. After a little, a catheter was passed through the stricture, and food administered through it. This was done at varying intervals, and with increasing difficulty, for about a fortnight, when the tube could no longer be passed, and again the enemata were had recourse to. As he was daily growing weaker and more emaciated, I was asked to see him with a view to perform a gastrostomy. The patient, in the hope of gaining by it, willingly submitted. I made the usual oblique incision, and had no difficulty in finding the stomach, which I attached by an oval ring of wire sutures simply passed through skin and outer coats of stomach-wall. The attachment was not so strong as I could wish, but the patient was so depressed from the shock of the operation, that I was anxious to get through with it in as expeditious a manner as possible.

Four days after, I made the opening into the stomach, by means of a tenotomy-knife. I had some difficulty in passing the catheter through the opening. He lived for three weeks, and expressed himself as somewhat easier. I, however, could not see any improvement in his condition. The union between the stomach and abdominal walls, although very slender, was continuous all round, except at one point at the upper angle, where the attachment had given way. As the patient died suddenly immediately after being fed, it is more than likely some fluid passed into his peritoneal cavity, and produced collapse. No *post mortem* examination would be allowed. Although this case was considered to be one of malignant stricture, the symptoms to my mind would point to its being more likely a simple fibrous stricture.

CASE II.—J. M., aged 47, labourer, was placed under my care in February 1884, for stricture of the œsophagus. Personal and family history good. For a year he suffered from dysphagia, which slowly and evenly increased till complete obstruction occurred. At

the time of his admission, he was emaciated to an extreme degree. His temperature was subnormal. He did not complain of hunger, and but slightly of thirst. He seemed listless and indifferent. No instrument could be got through the stricture. He was fed on nutrient enemata, which after a time he rejected. I proposed gastrostomy as soon as he was admitted, but he would not submit to it. After a fortnight, when he was still more depressed, he requested it to be done. The incision was made in the usual way. I had no difficulty in finding the stomach. In this case, I tried Mr. Howse's method of attaching the stomach to the abdominal wall by two circles of sutures. The method is tedious and somewhat difficult. When I had got through about half the process, the patient got into a collapsed state, from which with difficulty he was rallied. I completed the operation by the single inner ring of suture. As the patient showed no signs of rallying, I opened the stomach about eighteen hours after the first operation. The administration of food and stimulants did not seem to have much, if any, effect in bettering his state. He died about thirty-six hours after the operation.

The *post mortem* examination revealed the case to be one of simple fibrous stricture close to the cardiac end of the tube. The stomach and abdominal walls were in contact, but there was scarcely any adhesion of the peritoneal surfaces to one another.

These two cases are typical of a large class, in their history, symptoms, progress, treatment, and final issue; and you will admit that the prospect in such is not a hopeful one. Against that, however, there is a large class of cases of stricture that, if not permanently cured, are at least much benefited by this mode of treatment.

In the first stages of idiopathic or malignant stricture, the patient, as a rule, is under the care of a physician, who treats the dyspeptic symptoms, occasionally passing a bougie, and in this way temporises till it assumes a serious aspect. The propriety of surgical interference is then for the first time entertained, and the question arises, Is the patient to be let die of starvation, or do his condition or chances of improvement justify one in subjecting him to the risks of such serious operations as œsophagostomy or gastrostomy? Cases due to traumatic causes, as the swallowing of caustic fluids, or the presence of rough foreign bodies in the œsophagus, come immediately under the care of the surgeon, and are dealt with on sound surgical lines, according to the conditions existing at the various stages of the case.

I will now direct myself to the consideration of the first class of cases that come most frequently under our care, and generally at a period when the patients are reduced to a very low state by a process of slow starvation, as well as from the effects of the malignant dyscrasia. When we see a patient in danger of death from persistent obstruction to the passage of food into his stomach, we will agree that it is desirable an effort should be made to establish an artificial opening through which it could be administered. The two ways of accomplishing this end are œsophagostomy and gastrostomy.

Notwithstanding the able advocacy for the first of these methods by Mr. Reeves, the great majority of experienced surgeons are against it, on the grounds that it is a more difficult and dangerous operation than gastrostomy, as well as from the fact that it is not applicable in most malignant cases, where the disease is usually found at the cardiac end of the œsophagus. The other more usual and safer method of relieving this state is gastrostomy.

We will now consider under what conditions this should be practised. Our object in the performance of all operations should be to prolong the life of the patient, as well as to render what remains of it, if not more useful and enjoyable, at least more tolerable. I believe that, in a great number of the cases subjected to this operation, the very opposite has resulted, life curtailed and suffering increased.

What, then, is the value of gastrostomy, and under what conditions should it be practised? In considering this aspect of the subject, it may be well to make the following divisions into, first, cases where the obstruction in the œsophagus is impassable; second, where the obstruction is considerable but not impassable.

Cases of complete obstruction may be very recent, or have existed for some time, and may be due to causes of a simple, specific, or malignant character. In the worst of these forms, where the obstruction has been complete for some time, the patient getting his only support through his rectum, when he lapses into a listless state, when his extremities get cold and his temperature subnormal; when, perhaps, he complains a little of thirst, and has no desire for food. Operation under such conditions is worse than useless. If the patient does not sink immediately, from the shock of it, it is sure to shorten and render more uncomfortable the little span of life that remained to him.

At an earlier stage of complete obstruction, when the patient suffers from the pangs of hunger, and when the vital powers are not too

much reduced, the operation may be entertained, and, indeed, be followed by some benefit, especially if the obstruction be due to causes of a non-malignant nature. But, should it be of a malignant character, I hold that operation is not desirable, and ought not to be urged on the patient, for we have in such cases to contend with, not alone depressed vitality from inanition, but as well with the dyscrasia produced by the malignant taint. In giving advice in such a case, I would explain the risks of the operation, and the best result that might be expected from it, and let the patient or his friends urge its performance.

Partial strictures differ in degree from that where there is a slight difficulty in swallowing to one where fluid only can be got through, and in a more advanced stage, but slowly, and in very small quantity. Under such conditions the bougie is generally employed, and occasionally proves most useful, but it frequently fails; it can be passed one day and not another, and finally not at all. When the obstruction becomes more and more marked, notwithstanding all that has been done for it, the case presents a serious aspect.

In this condition there are two methods offered for dealing with it. First, the permanent wearing of a tube in the œsophagus; and, second, gastrostomy.

The first has been strongly advocated by Mr. Durham, and successfully practised by him and other surgeons. If it can be tolerated, there is no doubt as to its superiority over gastrostomy. But in cases where it cannot be worn without causing great pain and inconvenience, gastrostomy may be had recourse to, and with a fair prospect of success.

The patient's vital powers are not yet too much depressed to prevent him deriving benefit from the free administration of food through the artificial opening, while at the same time the absence of irritation secured by suspending the functions of the œsophagus will, in malignant cases, modify the progress of the disease, and, in cases of traumatic stricture, by allaying its irritability, may possibly permit of its being successfully treated by dilatation. In syphilitic disease the repose will favour its healing, and, as in the interesting and instructive case reported by Mr. Davies-Colley, the condition of the part may be so far restored as to allow of the closing of the gastric fistula after it has served its important temporary duty.

For the incipient manifestation of stricture, the new heroic methods of treatment are never entertained. At this stage the cases, unless due to traumatic causes, are generally found in the hands of the physician, who treats them in the stereotyped manner.

In the traumatic and idiopathic fibrous strictures, the timely, judicious, and persistent use of the bougie, if it does not completely cure, gives great relief, and thus wards off for a long period all disagreeable and dangerous symptoms.

Even at such an early period, should the use of the bougie give rise to continuous and increasing irritation, and the passage of food be attended with pain, and especially if there is reason to suspect the existence of a malignant growth, the operation of gastrostomy might be fairly entertained. It may appear strange to advocate such a serious operation while there is still ability to get food into the stomach by the natural channel, but if we consider that irritation caused by the passage of food and instruments only aggravates the symptoms, and as a result of that we find that the condition of the patient, both locally and generally, is deteriorating, it is but reasonable to suppose that, if we remove all such sources of irritation, the affected parts will be placed in the best possible state for improving.

I would venture to suggest the following rules regarding the performance of the operation of gastrostomy.

1. In cases where the obstruction is partial, it should not be entertained in non-malignant cases so long as a bougie can be passed, or a tube worn to enable the patient to take sufficient nutriment. But should the passing or wearing of an instrument cause great irritation, while the difficulty in overcoming the obstruction is increasing, the operation may, I think, with justice be undertaken. For by it the affected parts are placed in a state of physiological rest; which tends not alone to the improvement of the part, but renders it more amenable to other forms of treatment.

2. In cases due to malignant obstruction, where the dysphagia is becoming both painful and more marked, if the permanent wearing of a tube cannot be tolerated, there should be no time lost in performing a gastrostomy.

3. In cases where the obstruction is almost complete, and where in non-malignant cases bougies cannot be passed, and before the patient becomes too much exhausted and the digestive functions vitiated, the surgeon is fully justified in urging the operation.

4. In cases where complete obstruction has existed for a short time, the patient's strength being fairly sustained by enemata, and there is

no malignancy, the operation may be undertaken with hopes of improvement; in malignant cases, at this stage, it should not be urged.

5. In the advanced stage of complete obstruction, no matter what the cause be, the operation should not be undertaken, for the patient, if he survive the immediate shock from it, cannot live more than a few days, that are passed in increased discomfort.

Regarding the mode of performing the operation, surgeons differ, 1, as to the course of the incision; 2, as to the mode of attaching the stomach to the abdominal wall; 3, as to the time and mode of forming the fistulous opening.

Regarding the first, I do not think it makes much difference how the incision is made, provided it is just large enough, and so placed as to allow of the stomach being seized and easily drawn through the wound.

Theoretically, an improvised sphincter to guard the fistulous opening is a very desirable thing, but if the vertical incision renders the operation more tedious or difficult, I question if the practical advantages supposed to be gained by it will make up for that. The usual incision, and the one which I have practised, is the oblique, commencing a little below, and to the left side of, the tip of the ensiform cartilage. By this I believe the stomach is best exposed, and most easily secured. In carrying out this first step of the operation, the mistake is generally made of placing the line of incision too near the border of the costal cartilages. The finger's breadth that is usually recommended, looks, before operation, just sufficient for the purpose; but after the incision is made the upper flap is retracted and gets tucked up close to the ribs, rendering it impossible to pass the outer ring of sutures, should such be the intention of the surgeon. The incision should be begun about an inch below the tip of the ensiform cartilage, a little to the left of the middle line, and extended obliquely downwards and outwards, keeping at least fully two inches from the border of the costal cartilages. The minor details of this step of the operation I may pass over. There are also different methods practised of attaching the stomach to the abdominal wall. The ordinary one, by the single ring of sutures, although simple and expeditious, is not a secure one. There is great liability for the weak attachment to give way at points, and in this way subject the patient to the risk of extravasation into the peritoneal cavity.

I have seen Professor Dittel, of Vienna, practise a method that I thought a very good one. After incising the abdominal wall, he attached the parietal peritoneum to the skin by numerous points of fine suture. By means of a stout curved needle, in a needle-holder, he passed a circle of sutures, forming broad loops, through the outer circle of the stomach, and then through the whole thickness of the abdominal wall, about half an inch from the edge of the incision. By this means he brought a broad band of visceral and parietal peritoneum in contact. Between the large sutures he passed a number of fine ones, and in this way secured a close attachment of the stomach to the abdominal wall; this completely occluded the peritoneal cavity, and removed any risk of the passage of fluid into it. Should it be thought desirable to establish immediately a fistulous opening in the stomach, I think, however, the method practised by Verneuil and Howse, has most to recommend it; by it a broad band of visceral is brought into close and accurate contact with a similar one of the parietal peritoneum. This is accomplished by passing an inner and an outer circle of sutures, and secures accurate adaptation of the stomach to the abdominal wall.

The means recommended to accomplish this, namely, by passing a Liston's needle first through the abdominal wall, then through the outer coats of the stomach, then, again, through the wall of the abdomen, is not at all an easy matter to accomplish, especially when the tissues are thick and dense. A better way, to my mind, would be to have a suture, armed at one end with a curved needle, at the other with a straight one; the curved one should be passed, by means of a needle-holder, through the outer coats of the stomach, and then through the abdominal wall, about an inch from the edge of the wound; the straight through the wall nearer the incision; and the suture then tied in the usual manner over some suitable resisting medium. I believe this step of the operation could be accomplished in this way with both greater accuracy and ease.

As regards the manner of forming the fistulous opening in the stomach, I agree with those who advocate the small one. In the last case I operated on, I found the following method of making the opening an admirable one. While the exposed portion of the stomach was held well forward, I passed a tenotomy-knife obliquely through its coats, making a small opening. I then slipped along the blade of the knife, as a director, an ordinary silver probe, bent to a right angle, about an inch from the point. I next removed the knife, and intro-

duced another probe, similarly bent. Then, finding out the course of the muscular fibres, and pulling at right angles to them, I thus secured an opening that easily admitted a No. 9 catheter. After food was administered, and the catheter withdrawn, the opening closed, and effectually prevented any regurgitation. For the first three or four occasions, it may be necessary to use the probes till the fistulous opening becomes sufficiently patent to allow the passage of the catheter. The little fluid, not more than a few drops, that escapes at the moment of the withdrawal of the point of the catheter from the wound, can be safely guarded against by a little roll of absorbent wool, placed round the opening. I have seen the thermo-cautery used for making the fistulous opening; and those who fear hæmorrhage from the stomach-wall, will find it a safe and effectual means.

The time for opening the stomach should vary with the requirements of each case; in some, it should be done immediately; in others, the full period of four or five days may be allowed to elapse, as recommended by Mr. Howse.

In cases that are very much reduced and feeble through inanition, and especially in malignant cases, I think it is most injurious to defer the final stage, as the increased depression from want of food, aggravated by the shock of the operation, subjects the patient to far greater risk than the chance of setting up inflammation from extravasation into the peritoneal cavity. After a carefully conducted operation, such as those practised by Dittel and Howse, the risk is almost *nil*. In non-malignant cases, where the operation is likely to result in a permanent benefit to the patient, and in the very early stages of malignant obstruction, Howse's method of dividing the operation into two stages is the more preferable, as by it a more permanent and accurate attachment is more likely to be secured all round the fistula; besides, the patient is in a better condition to be subjected to such treatment.

As the result of the great strides lately made in the field of abdominal surgery, gastrostomy holds a prominent position. Like all novel operations that hold out even the most slender prospects of success in what has hitherto proved a most fatal disease, it has been too freely practised. Its indiscriminate application may possibly endanger its usefulness as a means of treating suitable cases; for most medical men, seeing the high rate of mortality attendant on the operation as at present practised, may be deterred from recommending it in suitable cases. Hence it is the duty of the surgeon to exercise a wise discretion in the selection of the cases he submits to the operation; and, while he is firm and decided in recommending early operative interference where he finds palliative measures not likely to succeed, let him be equally firm in declining to operate in extreme conditions. Notwithstanding the importunities of patient or friends, I do not think I can more fittingly close my remarks than by quoting the words of Professor Billroth on a kindred subject. He says: "It is now the task of the present day to recognise and define still more clearly the class of cases in which surgical measures are of use. If we have here and there pushed the limits of surgical benevolence somewhat too widely, we may, without discredit, retract them a little as our experience extends, but at the same time fix them upon a still firmer basis. If the surgeons of to-day will not fancy themselves to be such all-powerful fellows, but will be content to follow with modesty the example of their brethren the physicians, indefatigably investigating and combining, we may yet succeed in bringing cure, or at least temporary relief of their troubles, to still more unfortunate sufferers. This is, and always will be, the ultimate aim of our common scientific and humane endeavours, and the real end and object of our noble calling."

OBSTRUCTION OF THE OESOPHAGUS TREATED BY GASTROTOMY.

Read in the Section of Surgery.

By C. MACNAMARA, F.R.C.S.,
Surgeon to the Westminster Hospital.

J. E., a tailor, aged 51, married, was admitted into the Westminster Hospital on May 5th, 1884. The patient stated that she had been unable to swallow anything during three weeks before coming into hospital. She had had constant pain in the back of her chest, and had fallen off very much in flesh.

The patient had had no serious illness before that from which she now suffered. She had been pregnant five times, and had had two miscarriages. Many years ago she had a rash over her skin and a sore throat, with falling off of her hair. Her family history was good, giving no indication of hereditary disease. Three years ago the patient first found that she had some difficulty in swallowing solid food.