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PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Surgical Intervention in some Diseases of the Stomach.*^a By R. CHARLES B. MAUNSELL, M.B., &c. (Univ. Dubl.), F.R.C.S.I.; Surgeon to Mercer's Hospital; University Examiner in Surgery, University of Dublin; President, Dublin University Biological Association; Fellow and Member of Surgical Council, R.A.M.I.

THE subject which I have chosen for my Address, although practically unknown some ten years ago, has already grown to such dimensions that it would be impossible for me to treat of it in an exhaustive manner, so I must crave your forgiveness for the fragmentary style of what I am about to say.

My intention is simply to indicate some of the pathological conditions of the stomach which might be ameliorated or abolished by surgical intervention, briefly reasoning from well-known physiological and mechanical premisses, where such are available, or perchance still using the old and hard-dying method of empiricism.

^aThe Presidential Address delivered at the Opening Meeting of the Twenty-Ninth Session of the Dublin University Biological Association, held on Thursday, November 19, 1903. [For the further Proceedings of this Meeting see page 54, *infra*.]

2 *Surgical Intervention in some Diseases of the Stomach.*

If from our premisses the conclusion is drawn that surgical intervention is advisable, it then remains for us to consider what class of operation should be done, leaving the innumerable modifications and technicalities to the reasoning powers or experience of each individual surgeon, merely dealing with principles which so often become obscured in a multitude of detail.

Gastritis naturally forms a starting point for our discussion, more especially as almost all operators of large experience have recorded cases of distinct amelioration, or even cure, of this common and distressing complaint; but we must define which forms of gastritis may be thus benefited, and seek for physiological reasons.

We may at once dismiss all acute and the majority of chronic cases, unless from their frequent recurrence, severity of gastralgia, or other symptoms, there are grounds for suspecting ulcer, perigastric adhesions, or cicatricial deformity of the stomach, when they would be treated for these conditions as recommended later on.

In ordinary chronic gastritis, or so-called chronic gastric catarrh, the hydrochloric acid of the gastric juice is greatly diminished, or in advanced cases is entirely absent; at the same time the pepsin diminishes, but by slower stages.

In most cases the stomach retains its normal size, or may even be contracted; in such, although medicine often can do little, surgery holds forth no hope.

There are many cases in which the stomach walls stretch from atony, or where more or less pronounced kinking of the pylorus or duodenum, due to gastropptosis, movable right kidney, or general visceroptosis, adds an element of obstruction leading to dilatation. It is amongst this group that we find cases which surgery can benefit.

Mere gastropptosis or visceroptosis is no indication for operation, neither is mere increase in size of the stomach. Many prolapsed and many comparatively huge stomachs functionate fairly well. Inability of the stomach to empty itself completely is the only direct indication we should recognise.

It is a matter of common knowledge that the stomach should be completely empty of all food within three to four

hours after a light meal, and six to seven hours after a heavy mixed meal, so if the stomach tube of Kussmaul, or the stomach bucket of Einhorn, reveal remnants of food later than this, we may consider retention present; but it is better to make it a working rule, that following an ordinary mixed meal over night, the stomach should be completely empty in the morning.

We must not expect to find large lumps of food in the material drawn off, for when there is no actual diminution of the calibre of the pyloric orifice, large boluses are easily gripped and propelled by the stomach, and the only tell-tale signs may be undigested starch granules, or the presence of peptones.

If medical treatment fails after a thorough trial, surgery can promise relief in many cases by procuring drainage through a well-planned gastro-enterostomy opening. I intentionally make use of the word relief, not cure, as the careful investigations of Fantino¹ on Carle's cases, and of C. S. Fisher² on Weir's cases, not to mention many other observations, have shown that gastro-enterostomy does not improve the secretion of gastric juice, or always decrease the dilatation; but no one denies that the subjective symptoms almost, if not entirely, disappear.

There is another class of dyspepsia in which surgery has done more, not only abolishing subjective symptoms, but actually restoring the normal secretory power to the stomach, as proved by Fantino and others, although Fisher quotes some cases to the contrary. I refer to the group presenting excessive acidity or hyperchlorhydria. Whether these cases are inflammatory in origin is debated by some, but it is hard to believe that microbes are not at the bottom of the mischief.

Reichmann,³ Ewald,⁴ Einhorn,⁵ and others, state that hyperacidity is present in about half the number of dyspeptic cases, but in most people it either causes no special disability or is amenable to careful medical treatment. In some extremely obstinate and distressing cases surgeons now intervene, and there appear to be three chief indications for this intervention:—

1. Obstinate dyspeptic symptoms.

4 *Surgical Intervention in some Diseases of the Stomach.*

2. The occasional extreme difficulty of telling whether ulceration is present or not.

3. The rare condition, described by Reichmann⁶, in which continuous secretion of hyperacid juice is present, accompanied by slight dilatation without food retention, or with only slight traces of starch and peptones.

Pawlow⁷ has proved that, when at rest, the stomach should contain no gastric juice, or at most a few c.c.'s. He has also demonstrated that a simple mechanical stimulus does not call forth a flow, so we may rest satisfied that the passage of a stomach tube or bucket will not account for the fluid obtained, more especially as the juice would not begin to flow for some minutes after the application of any stimulus.

If all medical means have been tried without success, prolonged or permanent drainage should be instituted. This may be secured either by pyloroplasty or gastro enterostomy.

An appeal to physiology supplies a good reason for this seeming empirical line of treatment.

Pawlow⁸ has shown that when an acid is applied to the duodenal mucous membrane a spasm of the pylorus is started, which does not relax until the acid has been neutralised by the biliary and pancreatic secretions. This reflex mechanism normally regulates the departure of chyme from the stomach, but we can easily understand that where there is an excessive amount and an excessive acidity of the gastric juice the pyloric spasm would be more frequent and more prolonged, forming an actual obstruction.

Pyloroplasty would appear to be an ideal operation, as it prevents spasm by severing the sphincter; but experience has shown that where more than the most moderate dilatation is present, pyloroplasty fails to drain adequately.

W. J. Mayo, of Minnesota⁹, has recently published nineteen cases of pyloroplasty for dilated stomach; six had subsequently to be supplemented by gastro-enterostomy before satisfactory drainage could be secured.

Mayo, in the same communication, states that gastro-enterostomy in cases with a non-strictured pylorus is often a failure, as the opening tends to close in a few months—he records that eight out of twenty-eight cases in his list required

secondary operations, and quotes Ochsner and Cordier as being of the same opinion.

Reasoning from analogy to urethral, intestinal and other fistulæ would tend to support this view, but, on the other hand, we have Mayo Robson¹⁰ and other experienced operators who are convinced that if a sufficiently patent opening is secured it will not subsequently close. At any rate, it does not appear to be a matter of supreme importance, as it must only occur in a very few cases, and the majority of these will probably have been very considerably improved by the functional rest during the four to six months previous to closure of the abnormal opening.

I should have mentioned before that the opinion is growing stronger every day that the pyogenic and other organisms have a great deal to do with the causation or aggravation of inflammatory gastric diseases, and we should always remember that dental or posterior nasal septic foci may be the cause of our inability to relieve without operation, as the most aseptic foods or the best of medicines are powerless when swallowed with a constant admixture of pus.

We can pass by an easy gradation from gastritis to gastric ulceration; indeed, clinically, it is often impossible to distinguish between them, and in a large number of the class which we have just considered gastric ulceration is present without sufficiently obvious signs to lead to its accurate diagnosis.

We all know the lengthy list of supposed causes and supposed varieties of gastric ulcer, but perhaps it would be an advance if we simplify our conception of this complaint.

It is now granted that ulcers occurring on the limbs are due either to the breaking down of one of the so-called infective granulomata or else to septic infection. All the blood and lymph vascular or nervous derangements are looked upon merely as predisponents or aggravators additional to the ordinary mechanical and chemical irritants. We no longer describe numerous kinds of simple ulcer, but numerous conditions from the most simple and painless abrasion to the most painful or callous sore.

It is also granted that ulcerations of the intestines are all microbial in origin.

Analogy would also lead us to look upon gastric ulcers in

6 *Surgical Intervention in some Diseases of the Stomach.*

the same light, but apart from this there are a few facts which tend to strengthen this view.

1. Many clinical observers have noticed the septic condition of the mouth in patients suffering from gastric ulcer, and my personal experience has been that in no case of gastric ulceration are the teeth and gums free from a distinctly septic focus. The fact that ulceration is almost entirely confined to the poorer classes amongst females adds probability to this view, since the better classes, especially the females, pay more attention to their teeth, and can afford better artificial arrangements.

2. In many stomachs the mucous membrane contains a considerable amount of lymphoid tissue, which would be prone to retain septic organisms, and lead to suppuration and ulceration.

3. Ulcers affect stomachs which have already suffered or contemporaneously suffer from chronic gastritis with infiltration of the mucous membrane by inflammatory granulation tissue, either in patches or universally.

4. The ulcers are commonly multiple, and very frequently occur on opposed surfaces, evidently due to contact infection.

No doubt there are many blood and lymph vascular and nervous predisponents which determine the acuteness or chronicity, and the constant presence of chemical irritants, such as hydrochloric acid and pepsin, makes it extremely hard for healing to take place.

The deleterious effect of hydrochloric acid has been proved by experiment,¹¹ and also by the interesting cases which have been recorded¹² where ulceration occurred in the jejunum, following on gastro-enterostomy in the presence of marked hyperchlorhydria. This has led Neumann¹³ to suggest the advisableness of performing the operation of temporary jejunostomy until the acidity of the gastric juice be reduced.

In practically all cases of gastric ulceration the condition of hyperchlorhydria is present, at least in those cases which present symptoms sufficient for clinical diagnosis by the average practitioner. Whether this condition is primary or secondary may be debated, but I am inclined to think that gastritis of septic origin causes hyperchlorhydria. The hyper-

chlorhydria so aggravates the condition that ulceration takes place; the irritation is thus further increased, a vicious circle is established and maintained by spasmodic closure of the pylorus, due to the excess of acid acting upon the duodenum.

Pawlow¹⁴ mentions a very instructive case of a dog with gastric pouch, the mucous membrane of which became inflamed, a condition of hyperchlorhydria supervened, with perforation of a round ulcer.

In a minority of cases ulceration occurs in stomachs which secrete subacid juice, or, as recorded by Einhorn,¹⁵ in complete achylia. These cases present few definite symptoms, and are usually diagnosticated during an operation, at autopsy, or by the supervention of some complication. It is not hard to understand the occurrence of ulceration in these stomachs, as the mucous membrane is in a very abnormal condition from chronic gastritis. In the great majority of cases of ulcer the stomach is more or less enlarged, probably on account of pyloric spasm. The enlargement will not be much in a downward direction, unless there is a condition of gastroptosis, but careful percussion in the nipple and axillary lines will demonstrate upward distension.

The treatment of gastric ulcer should be medical, but this treatment should be thorough, and we must remember that an attempt at treatment while the patient attends dispensary or consulting room must result in failure, if not serious accident.

Perhaps a few suggestions based upon physiological reasoning would not be out of place, as a like treatment might be of use during the process of wound repair after operation.

Rest in bed is absolutely essential. At first stop all food by mouth, feed and give water per rectum. Large doses of carbonate of bismuth and of bicarbonate of sodium may be given, as the bismuth has a soothing action upon the raw area, and the sodium salt not only helps to neutralise any gastric juice excited by appetite or irritation, but it has been experimentally proved¹⁶ that a solution of bicarbonate of sodium actually inhibits gastric secretion.

After four to six days small quantities of milk may be given by mouth. Milk is the best food, as it is digested chiefly by the intestines, the fat which it contains inhibiting gastric secretion,¹⁷ and acting as a distinct stimulant of the pan-

8 *Surgical Intervention in some Diseases of the Stomach.*

creatic flow.¹⁸ Meat extracts and soups excite gastric secretion, therefore should not be given too soon.

When solids are allowed, scraped meat and egg are better than bread, as they are more easily digested, and the secretion they excite is not as rich in ferments¹⁹ as in the case of bread, and their digestion, unlike starchy food, is not hindered by the presence of the hyperchlorhydria. In very cachectic patients much benefit has been found to follow the subcutaneous injection of sterilised olive oil.

No matter how severe the symptoms are, or how pronounced the cachexia, non-operative treatment should be carried out conscientiously if there are no dangerous or actual mechanical complications obvious, but if any case resists treatment, or recurs, operation is the rational and safest course for the sake of the patient's comfort, or even life.

At first sight it may seem rational for the surgical consultant to advise excision of the ulcer and suture of the resulting wound, but perhaps a few arguments which can be brought forward may point out a fallacy in this advice :—

1. It is not usually easy to locate the position of an ulcer at operation.

2. Ulcers are most commonly situated upon the posterior wall, and are hard to reach, more especially if the base is adherent to the pancreas, &c.

3. Ulcers are very frequently multiple.

4. Ulcers are very frequent in the pyloric antrum and at the pylorus, where excision would lead to narrowing unless combined with pyloroplasty, which is not always advisable or readily performed.

5. The cause of the ulceration is in no way mitigated by the procedure, and the trouble may recur at a future date.

The operation of pyloroplasty has many advocates, but there are at least two great objections to it :—

1. It has been found²⁰ that where active ulceration is present at the pylorus, contraction frequently follows upon a pyloroplasty, and further operation becomes necessary.

2. It is very hard clinically to differentiate gastric and duodenal ulceration, or perhaps both lesions may be present, and pyloroplasty could have no beneficial effect upon the duodenal lesion.

Gastro-enterostomy has been found at once the most useful and the safest operation when all things are considered. We may confidently recommend it to our patients when we consider that Mayo Robson²¹ and other operators are able to show a mortality of less than 5 per cent. over a large number of cases, and several lists of from twenty to seventy consecutive cases with only a single death have been published in the journals during the present year.

A few thoughts as to the method of action of this procedure may be of interest. The opening being placed at the most dependent point, the gastric juice and other contents can freely enter the jejunum without passing through the pylorus. It has been found that they do not pass through much quicker²² than through a normal pylorus; but there can be no spasm or retention as there is no strong sphincter present. Not only does the acid juice drain away freely, but the unavoidable reflux of duodenal contents into the stomach may have a beneficial effect by neutralising excessive acidity.

At first this reflux was dreaded by operators, but it is now known to be a constant phenomenon in gastro-enterostomy, and of no grave import unless due to some actual obstruction of the jejunum at or below the artificial opening.

Rest is thus obtained, the pylorus, no longer irritated by constant reflexes from the duodenum, recovers itself, gradually reassumes its normal function, and shares with the abnormal opening the duty of emptying the viscus, and in a few cases may assume full control.

Time forbids that I should do more than mention many of the important and far-reaching complications and sequels of ulceration, such as distortion, dilatation, or hindered movements due to perigastric adhesions, which can be relieved by gastrolisis, with or without gastro-enterostomy, as each case requires; stenosis of the pylorus from cicatrices, which may be cured by pyloroplasty, or, better, by gastro-enterostomy; "hour-glass" and trilocular stomach, which require gastroplasty, &c.; perigastric or subphrenic abscess demanding incision and drainage; and we will pass to consider a few important points in connection with the serious complications—perforation and hæmorrhage.

The subject of gastric perforation is one on which I have

10 *Surgical Intervention in some Diseases of the Stomach.*

written²³ on two previous occasions, giving my own opinions and a digest from the literature on the subject. There is little new in the literature since my last paper; but as my own experience has been strengthened by two more successful cases, perhaps I may again state my conclusions, more especially as seven cases is a fairly large number for any operator to have treated.

Of the seven cases, three were males and four were females, two women and one man died, two women and two men recovered, and are still alive and well. The four cases which recovered were consecutive and subsequent to the other three. In six cases the soiling of the peritoneum was general, and accompanied by distinct general peritonitis; in one case the extravasation was local and easily treated.

There are a few points I feel constrained to refer to on every possible occasion: these are not so much aids to diagnosis as beacons to mark pitfalls which beset the path of those who read and trust many of the current text-books:—

1. Men and women of all ages are liable to perforation of a gastric ulcer.

2. The history may, but very often does not, disclose previous ulceration.

3. Shock is a variable sign, and tends to pass off to a great extent within a few hours. Twelve to twenty-four hours after perforation the patient feels much better, but examination reveals a rigid abdomen and lack of proper abdominal respiratory movements.

4. The temperature in the vast majority of cases is either normal or sub-normal during the first twenty-four hours.

5. The pulse rate in some women is frequent, in some infrequent; in the majority of men it is infrequent, ranging between sixty and ninety, unless the case has been left so long as to practically ensure failure from any form of treatment.

6. The character of the pulse is not hard and “wiry,” except in some long-neglected cases.

7. It is in most cases impossible to clearly demonstrate fluid in the flanks by percussion.

8. The “stomach-note” is still present, or is even exaggerated since perforation leads to paralytic distension of the stomach with gas, not to collapse of that viscus.

9. The absence or presence of liver dulness is too uncertain a guide to be of much assistance.

10. The tongue, as far as my experience goes, is always moist and white, or slightly yellow, not dry, brown, and cracked, until after the lapse of many hours. This point I consider of very great importance, as in at least two of the cases seen by me and by my colleague, Dr. Lumsden, the absence of dry, brown tongue, taken in conjunction with an infrequent pulse, had been considered by previous medical attendants sufficient to negative perforation, thus leading to unfortunate delay, and in one case ultimate death.

Many writers copy from one another vivid and heart-stirring word-pictures of perforative peritonitis easily remembered by the student, but only destined to lead him astray when he is launched into actual practice.

All modern surgeons and most physicians are agreed that if there is a reasonable probability that perforation has taken place the abdomen should be opened, as soon as arrangements can be made for the aseptic operation.

We must be very careful not to confuse expedition and hastiness or flurry. Cases which cannot wait an hour, or perhaps two, for adequate preparation, might as well be allowed to die in peace. Now-a-days operators are prepared at a few minutes' notice to bring every requisite to the patient's abode, but even so there is no objection from a practical point of view to bringing the patient to a hospital, where the environment and care are much better.

Once the patient is on the operation table there must be no loss of time. The whole, or almost the whole, secret of success rests on the rapidity and precision of the operator and his assistants.

Having opened the abdomen, the perforation should be closed by a double row of continuous suture and the peritoneum should be cleansed with gauze swabs and plenty of warm normal saline solution. The chief error is made in striving to do without free flushing, and in resting satisfied with mopping up the small amount of fluid seen immediately in the operation area, without making a rapid, but systematic, search through the whole cavity. I venture to state that there are very few cases of perforation in which the pelvis

12 *Surgical Intervention in some Diseases of the Stomach.*

is not full of fluid, and in which a hand passed above and behind the spleen on the left and above and behind the liver on the right, will not bring from these treacherous pockets sufficient morbid material to reward the operator for his search. To state the matter concisely—the unusual and doubtful thing should be to trust to limited mopping, and there should be very clear indications before thorough and systematic cleansing is pronounced unnecessary.

When there is much paralytic distension of the stomach and intestines, they should be incised and deflated before closing the abdomen. The practice of evisceration does not appear to be either necessary or expedient during the cleansing process.

There are a few points for further study and debate :—

1. When an ulcer has perforated at or near the pylorus should it simply be closed, or should a pyloroplasty or gastro-enterostomy be done immediately? I have myself done pyloroplasty on two occasions in these circumstances. The first case ended fatally five days after operation, the second recovered, but it is too recent to form an opinion as to the permanent cure of the tendency to ulceration.

The operation in both cases was difficult, as the pylorus was adherent, and I would in future favour gastro-enterostomy under like conditions.

2. Should gastro-enterostomy be performed in every case of perforation as a routine, if not directly contra-indicated by the collapsed condition of the patient? I take it for granted that if a strictured pylorus or other obvious deformity is found, the operator will treat it by some suitable procedure.

Hæmorrhage probably occurs in every case of gastric ulceration, but unless of fairly large amount it is either entirely digested or is passed unnoticed in the motions. The cases we are interested in are those where blood is either vomited or distinct melæna is present. In the first place we must remember that hæmatemesis may be only a symptom of purpura, scurvy, hæmophilia, &c., or one of nature's methods of relieving venous obstruction of cardiac or portal origin, or may be due to the rupture of an aneurysm, as occurred in a case of mine. The cases in which theoretically surgery might be useful, and in which practical

experience has proved it to be so, are cases due to acute, recurrent, or chronic ulceration, inflamed and eroded weeping patches, or in bleeding due to varicosity of the veins.

When called in consultation with reference to hæmatemesis or melæna what advice can we give ?

1. In all cases in which there is no history of previous ulceration, although the amount of blood lost may be a pint or more, it appears to be wiser not to operate.

2. If the bleeding should recur in some hours, and still be copious, the patient showing signs of continued loss of blood, operation should be considered.

3. If there is a history of previous ulceration, which has not been thoroughly treated, the same advice would apply ; but if the history reveal previous failure of non-operative treatment, operation should be very seriously considered.

4. If the history reveal recurring attacks of severe hæmorrhage operation should be considered imperative.

5. If in a first attack of acute hæmorrhage, or in recurring hæmorrhage of even a much smaller amount, structural changes in the stomach, such as pyloric stenosis, are clinically evident, or even strongly suspected, I would suggest that operation appears to be the only sensible line of treatment.

In those cases where it is not deemed necessary to operate, we may advise adrenalin chloride (Parke, Davis & Co.), 10 to 30 minims by mouth, to be repeated in four hours, or four of Burroughs, Wellcome & Co.'s tabloids of suprarenal gland broken up in water. If shock is great the hypodermic administration of 5 minims of sterilised adrenalin chloride acts both as a stimulant and hæmostatic, whilst the subcutaneous injection of 2 per cent. sterile gelatine solution, or intravenous infusion of normal saline, are both well-known and worthily trusted remedies in surgical practice.

The operative procedures advocated may be divided into four groups :—

1. Gastrotomy followed by the application of the actual cautery to the bleeding spot ; ligature or under-sewing of the ulcer or blood vessel ; invagination and ligature *en masse* of the ulcer, with supporting sutures applied on the serous aspect ; or excision of the ulcer with suture of the resulting wound.

2. Any of these proceedings followed by gastro-enterostomy.

14 *Surgical Intervention in some Diseases of the Stomach*

3. When the ulcer is at or near the pylorus, excision combined with pyloroplasty, or where the pylorus is not adherent pylorotomy.

4. Anterior or posterior gastro-enterostomy without any special immediate treatment of the ulcer or other bleeding area.

A knowledge of recorded cases, and of experiences mentioned in various debates, shows that any of the procedures mentioned in the first group are very difficult to carry out, as it is often impossible to locate the ulcer or other bleeding spot. There may be more than one area at fault, and ligatures or sutures are liable to cut, &c. The worst feature, however, appears to be that nothing is done to treat the original cause of the trouble.

The combination mentioned under the second heading seems very sound advice in cases where the bleeding is actually taking place, and is copious. We feel more confidence when the bleeding has been directly checked and the gastro-enterostomy ensures rest, and a return to normal of the mucous membrane. It would be wise to make the exploratory gastrotomy wound in a position where it could be made use of for gastro-enterostomy.

The two procedures mentioned under the third heading do not seem to have a very wide field for application, and would not appeal to me but for the advocacy of some well-known and trusted surgeons.

Of late the opinion has been gaining ground that the procedure of the most universal application is gastro-enterostomy without any previous search for bleeding points, trusting altogether to the rest and contraction produced by the free drainage. Personally, I am inclined to advocate this in all cases where the bleeding is not actually taking place during the operation, or in cases where the collapse necessitates expedition. In no case of any description would I recommend a prolonged search or attempt at hæmostasis, but would proceed after a brief, though methodical, survey to complete the gastro-enterostomy.

¹ Fantino. *Archiv. für klin. Ch.* Band XVII. S. 1 and 2.

² Fisher. *Med. Rec.* Sept. 8, 1900.

³ Reichmann. *Berl. klin. Woch.* 1887. No. 12.

⁴ Ewald. "Diseases of the Stomach." New York. 1892.

- ⁵ Einhorn. "Diseases of the Stomach." London. 1903.
- ⁶ Reichmann. Berl. klin. Woch. 1882. No. 40.
- ⁷ Pawlow. "The Work of the Digestive Glands." P. 86. (Translated by W. H. Thompson.) London. 1902.
- ⁸ Pawlow. Loc. cit. P. 164.
- ⁹ Mayo Robson. Annals of Surgery. July, 1903. P. 30.
- ¹⁰ Mayo Robson. The Lancet. Feb. 28, 1903. P. 572.
- ¹¹ Ewald. Klin. der Verdaungsbrach. 1 Theil., 3 Aufl. P. 122.
- ¹² Braun and others. Quoted by Mayo Robson. The Lancet, loc. cit.
- ¹³ Neumann. Deutsche Zeit. fur Ch. 1901.
- ¹⁴ Pawlow. Loc. cit. P. 171.
- ¹⁵ Einhorn. Loc. cit.
- ¹⁶ Pawlow. Loc. cit. Pp. 95 and 145.
- ¹⁷ Pawlow. Loc. cit. Pp. 33, 105 and 143.
- ¹⁸ Pawlow. Loc. cit. P. 105.
- ¹⁹ Pawlow. Loc. cit. P. 33.
- ²⁰ Robson and Moynihan. "Diseases of the Stomach, &c." London. 1901.
- ²¹ Mayo Robson. The Lancet. Loc. cit.
- ²² Fantino. Loc. cit. Also Fisher. Loc. cit.
- ²³ Maunsell. B. M. J., March 23, 1901; and Dubl. Jour. Med. Sc., May, 1903.

ART. II.—*A Short Note on the Treatment of Pulmonary Tuberculosis by Intratracheal Injections.*^a By T. GILLMAN MOORHEAD, M.D., D.P.H.; formerly Assistant Physician to Sir Patrick Dun's Hospital; Physician to the Royal City of Dublin Hospital, &c.

DURING the last few years numerous methods of treating pulmonary tuberculosis have been suggested by different writers, and in most cases some special remedy has been vaunted by its introducer as a specific for the disease, but has been found to fail completely in the hands of others. It is, therefore, I consider, the duty of anyone who has given a trial to any of the newer methods to report, from time to time, what success he has had.

Excluding specific treatment by the various tuberculins which are upon the market, the methods of treatment which are at present practised fall, naturally, under two headings—namely, those that aim at the indirect destruction of the bacilli by increasing the natural resistance of the body to their invasion, and those that aim at the destruction of the bacilli directly. Theoretically, the former method of treatment is, I think, preferable. Under this heading the treat-

^a Paper read at the Dubl. Univ. Biological Association.