opinion it did not give good results. As Musser, of Philadelphia, in his paper entitled "Oil of Eucalyptus in some Malarial Affections," seemed to show that the drug is useful in certain febrile states, I made a number of observations with the medicine in Malta fever. In the cases in which it was given it was always well borne, and as it is said to act as an antiseptic, carminative, and stimulating expectorant, further experience may prove it to be really beneficial. My own opinion is that it has no effect on the course of the fever.

Aconite.—At the beginning of the fever, when the temperature was high and continuous, some observations were made on the action of this drug, which was usually given in five-minim doses for several consecutive hours. The drug did not seem to have any effect on the temperature or on the general febrile condition.

Calomel.—Tommasi states that this drug seems to shorten the course of the fever when there is no diarrhoea. Gulia writes that it is the sovereign remedy and anchor of hope in some cases of this fever, and gives it as far as to induce slight irritation of the mouth. Marston thinks the occasional exhibition of a mercurial (calomel), combined with ipecacuanha and rhubarb, or colocynth, is very useful. I have never made any observations on the action of this medicine in Malta fever.

Salicylic Acid and the Salicylates.—Rummo states that he has tried salicylate of soda, but with negative results. Tomaselli is of opinion that salicylates used in cases of continuous high temperature tend to depress the heart, to weaken, to aggravate the sweating, and show no counterbalancing good effects. I think there is a temptation to exhibit this drug, especially in those cases in which the joints are painful and swollen; but as this condition is always associated with anæmia and depression of all the vital functions, this medicine ought to be avoided.

Other Drugs.—Finally, in regard to other medicinal treatment, Veale writes as follows: "Colchicum, with or without saline aperients, also in combination with aconite or quinine, arsenic, turpentine, salicylic acid, the hyposulphites, and many other drugs have been tried as freely as seemed to be safe, but no reliance can be placed on them, either to arrest the fever or even to diminish the night-sweats or the rheumatoid pains. Carbolic acid has been tried both by the mouth and subcutaneously. In no case did it do any good; in several it did very positive harm when injected under the skin. The solutions of carbolate of ammonia and of carbolic acid in combination with iodide of potassium, as recommended by Déclat and others, have also been used for hypodermic injection, but without any advantage. When the hæmorrhagic tendency has been a source of danger, the continued use of the tinctura ferri perchloridi has seemed to be beneficial. Ergot and ergotin have also been of service in arresting hæmorrhage and checking bronchorrhoea when it has been profuse, but neither remedy has any influence in arresting the progress of the disease. The hypodermic injection of morphine, and the liniments of aconite, opium, and belladonna are useful in relieving the lumbar, sciatic, and articular pains; but blisters appear only to substitute temporarily one pain for another."

CONCLUSIONS.

1. Malta fever is a specific disease quite distinct from enteric and remittent fever.
2. It is caused by the entrance into the system of a minute parasite.
3. No drug at present known has any power of modifying the action of the bacteria in the system.
4. Treatment is to be principally directed to keeping the patient's strength up by fluid, easily digested food, and, when required, by stimulants, and by attention to ordinary hygienic principles. Removal of the patient from the infective area does not cut short the course of the fever.

A NEW MYDRIATIC.—Bamberger and Müller (*Berichte der Chem. Gesell.*) have prepared from hydronaphthylamine a compound which promises to prove a powerful mydriatic, bearing the systematic name of tetra-hydro-beta naphthylamine, and having the formula $C_{10}H_7H_2NH_2$. According to Professor Filhene, of Breslau, the instillation of a small quantity of a 5 per cent. solution causes the dilatation of the pupil of the eye treated only, though after absorption of a minute quantity both eyes become affected. The dilatation is greater than that produced by atropine. This compound is said (*Chemical Gazette*) to act as a mydriatic by stimulating the nerve-endings instead of by paralyzing the muscles of contraction as does atropine.

A SUCCESSFUL CASE OF LORETA'S OPERATION ON THE STOMACH.

By FREDERICK TREVES, F.R.C.S.,

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So far as I am aware, only one successful case of Loreta's operation for non-malignant stricture of the pylorus has been recorded in this country. This single case was fully reported in the *JOURNAL* for February 19th, 1887. The operator was Mr. Robert Hagyard, of Hull. The patient was a woman, aged 51, who had been troubled with gastric symptoms for five years. She had become greatly emaciated; she was unable to take any food by the mouth, and the stomach was extremely dilated. No tumour could be detected in the vicinity of the pylorus. The operation was performed on March 7th, 1886, and the woman made an uninterrupted recovery. Mr. Hagyard, in a letter to me dated February 21st, 1888, writes: "The patient is perfectly well, there being no return of the symptoms of obstruction. The dilated stomach, which was so difficult to lessen, has now subsided, and my patient has just recently married again." A more admirable result modern abdominal surgery could scarcely claim.

The present patient was a carman, aged 27, who was admitted into the London Hospital under the care of Dr. Ralfe, on October 12th, 1887. He was suffering from vomiting and from severe gastric pain. There was nothing noteworthy in the patient's family history. With regard to himself, he had never had any previous illness of a definite kind. He had, however, led an irregular life, and had been a heavy drinker. His general health had suffered in consequence of his intemperance. He had never had syphilis. Three years ago he was kicked by a horse in the epigastrium. He became collapsed, and suffered much abdominal pain; he believes he vomited. He thought little of the injury, and was only laid up seven days. Eleven months before his admission into the hospital he began to experience gnawing pains in the belly in the region of the epigastrium. Previous to this he had had attacks of "disordered stomach," had impaired appetite, and occasional "bouts" of vomiting. He ascribes these symptoms to excessive drinking. The gnawing pain was a new feature. The pain increased in severity and in duration. It was paroxysmal, came on at intervals of one to three days, and appeared usually a short time after a meal. Very soon each attack of pain was followed by vomiting. The matter ejected was described as brownish, and he states that on each occasion he brought up a quart or so. The vomiting gave him relief.

The pain became more severe, and shot through to his back. He never passed a day without vomiting; he began to lose flesh, and was afraid to take food. During some of the attacks he stated that he became a little yellow. He does not appear to have ever had distinct jaundice. Some months before admission he had commenced the use of morphine, which he ultimately took on every opportunity. He now suffered from constipation.

On admission (October 12th, 1887) he was very feeble, anæmic, and much emaciated. He complained of an incessant gnawing pain in the right hypochondrium, and of occasional attacks of severe paroxysmal pain in the same region. During these attacks he would roll about in bed and scream, but it is possible that the paroxysms were a little coloured by his craving for morphine. The pain came on every few hours on some days, and was described as resembling colic. It was almost immediately induced by taking food. So marked was this that he was afraid to eat. He vomited copiously at least once every day, and was troubled with eructations of foul gas. The bowels acted about once a week. The tongue was broad, pale, and flabby, the pulse feeble, the temperature normal. An examination of the abdomen revealed a great dilatation of the stomach; there was much tenderness complained of in the epigastric and right hypochondriac regions. The seat of the greatest pain was a spot about one inch and a half above the umbilicus. This pain was always described as shooting back to the spine. There was no jaundice; the urine was scanty but normal; the liver, spleen, lungs, and heart were reported as healthy. On the day after admission the patient vomited three quarts. When the stomach was empty, a little dulness was made out in the vicinity of the pylorus. It blended

with the area of hepatic dulness. No tumour of any kind could be detected. The patient had never vomited blood, nor does blood appear to have been passed by the bowel.

The stomach was washed out daily, and very little food was given by the mouth; nutrient enemata were commenced, and the pain was a little modified first by salicylic acid and later by cocaine. Although the pain and the vomiting were lessened, the patient did not exhibit any general improvement. He continued to waste and to lose strength.

On October 31st, oedema of both feet appeared.

On November 14th the report was to the effect that he was more emaciated and more anæmic, and was so weak as to be unable to sit up in bed. He was now fed solely by nutrient enemata, taking only a little fluid by the mouth. He was always found lying on the left side, with the knees drawn up.

On November 30th it was evident that the patient could not live many days longer unless he was relieved. To his previous symptoms diarrhoea had been added. He was extremely feeble, and utterly apathetic.

Dr. Ralfe had formed an opinion that the case was one of non-malignant stricture of the pylorus. At his request, I arranged to make an exploratory incision, and if necessary to dilate the pylorus.

The operation was performed on December 3rd, 1887. Chloroform was administered, and the operation was carried out under the spray. Carbolic acid lotion of the strength of 1 in 40, and warmed to the temperature of 90° F., was used throughout the operation. All the sponges used were warmed.

I made a vertical incision, four inches in length, in the median line. The lower end of the cut reached as far as the umbilicus. The greatly dilated stomach was at once exposed. The pylorus was at first difficult to define. It appeared to be imbedded in a mass of almost cartilaginous hardness, which was firmly adherent to the under surface of the liver. Not only was the actual pyloric extremity of the stomach adherent to the liver, but a portion of the viscus itself, to the extent of some three square inches, was in like manner attached.

It was evident that the adhesions were inflammatory, and that they were especially tough and thick in the region of the pylorus. I divided the adhesions as freely as was possible. The segment of the liver to which they were attached was pale, and had the appearance of being atrophied. It was found impossible to quite free the pylorus and to entirely separate the stomach from its attachment to the liver.

I then made a vertical opening into the stomach midway between the two curvatures and about two inches from the pyloric orifice. Before this opening was made the stomach was drawn as far forward into the wound as possible, and was gently held by a small pair of dressing forceps, the blades of which were protected by india-rubber. The interval between the viscus and the parietes was plugged with sponges so that any fluid escaping from the stomach would have been prevented from reaching the peritoneal cavity. To avoid bleeding in opening the stomach I think that the incision should be vertical, and should not be too near the pylorus. It should be scarcely large enough to admit the index finger, with which it is at once plugged. In Mr. Hagyard's case the bleeding at this stage of the operation is described as "terrific." A rush of escaping gas followed the opening of the stomach, but as the wound was at once plugged with the right forefinger no fluid escaped and there was no bleeding. Within the stomach the portion of the gastric wall still adherent to the liver could be well made out. It was perfectly smooth. The pylorus was surrounded by a ring of very dense tissue, and appeared to be set in cartilage. It would not take the point of the forefinger. I steadied the pylorus with the left hand while I gradually bored the right forefinger into the constricted orifice. The process of dilatation was slow, but in time the finger was introduced into the duodenum. Without withdrawing the finger from the stomach I enlarged the wound in the viscus with a bistoury held in the left hand, and passed the middle finger into the stomach. The wound even now was small, and the fingers were closely embraced by the gastric wall. Under such conditions hæmorrhage was scarcely possible. The middle finger was passed through the pylorus, and the forefinger inserted slowly after it. In a little while the orifice was sufficiently dilated to take the two fingers. During the process the pylorus was steadied by the left hand. This dilatation appeared to me to be quite sufficient, because an orifice admitting the two fingers together would have a circumference of about four inches. Loreta is reported to dilate the pylorus with the two forefingers until they are more than three

inches apart. This would represent an opening with a circumference of not less than seven inches. Had dilatation to this extent been attempted in the present instance the walls of the viscus would certainly have been ruptured.

The wound in the stomach was now closed by a continuous suture of fine silk. This suture included the mucous and muscular coats, and was introduced by means of a Hagedorn's needle. The silk was so applied as to arrest some little bleeding that was occurring from the edges of the incision. The ends of the silk were cut short, and the wound was then completely closed by many points of Lembert's suture, which involved the serous coat only. The parts around the operation area having been cleansed, the abdominal wound was closed by deep interrupted sutures in the usual way. The wound was dressed with a single sponge dusted with iodoform. This was firmly secured in position by means of a broad and tightly applied flannel binder. The temperature on the evenings of the third and of the eleventh days rose to 100°; with these exceptions it remained normal.

The patient at once experienced relief from the operation. He was kept under the influence of morphine, and was fed by nutrient enemata; he was allowed to suck a little ice to relieve thirst; there was no return of the vomiting. On the seventh day the stitches were removed, and the wound supported by gridiron strapping. On the evening of this day the patient vomited a little; this was the first and only time that he was sick after the operation. He became greatly excited during this attack of vomiting, sat up in spite of all remonstrances, and made violent efforts to get out of bed; he persisted in yelling for nearly an hour. As a result of these exertions the wound, which had healed by first intention, gave way, and the stomach was once more exposed. The margins of the incision were at once brought together by means of long strips of plaster, and a stronger binder was applied. As the sickness was apparently due to the decomposition of accumulated mucus in the dilated stomach, that viscus was now washed out every other day with a little warm boracic lotion. This gave the patient great relief; the nutrient enemata were continued.

On the ninth day a little milk and soda water was given by the mouth; the quantity of food thus administered was gradually increased each day. The nutrient enemata were continued until the fourteenth day, when they were finally omitted. The patient after that date took all his food by the mouth.

On the eleventh day some solid food was given in the form of toast soaked in tea. The washing out of the stomach was discontinued on the seventeenth day. The patient complained of no pain, but remained very restless, and persisted, except when restrained, in sitting up in bed. The wound healed by second intention. The bowels acted regularly and without aid after the enemata had ceased to be used.

On the 20th day the patient was allowed to leave his bed. Four days after this he insisted upon leaving the hospital, and walked without assistance to the door. He had now no pain and no sickness and was taking his food well; the stomach was, however, still much dilated, and the wound was not firm. It was intended that massage should be applied to the abdomen, but no arguments would induce the patient to remain in the wards.

The man presented himself at the hospital at the end of two or three months. He was greatly improved in health, could eat well, was never troubled with sickness, and had no difficulty with his bowels. He complained of a sense of weakness at the wound. The cicatrix had yielded considerably, leading to some protrusion of the contents. A stout belt was ordered, and with this he expressed himself as feeling quite comfortable.

I saw the patient again in December, 1888, about twelve months after the operation. He now complained only of poverty. He had an excellent appetite, and was troubled with neither sickness nor dyspepsia. He had returned, so far as his very limited means would allow, to his previous intemperate habits. He still wore his belt, and the stomach appeared to have entirely returned to its normal dimensions.

It is evident that this operation must of necessity be of very limited application, since the examples of non-cancerous stenosis of the pylorus are quite rare. The procedure has been carried out with astonishing frequency on the Continent, and it would be interesting to know the precise pathological condition which has been found to be associated with these operations. The specimens in the various museums in London throw little light upon the fibrous stricture of the pylorus of which so frequent mention is made in Continental literature.

In the present case the narrowing of the pylorus appeared to be, to a great extent, due to the contraction of peritoneal adhesions. The trouble may have originated in an injury to the stomach due to the kick from a horse, or may have followed upon a perforating ulcer at the pyloric extremity of the viscus.

TREATMENT OF EMPYEMA BY A VALVULAR TUBE HERMETICALLY SEALED TO THE CHEST.

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IN proceeding to give an account of the principle and mechanism involved in this plan of dealing with empyema, it will simplify my task considerably, as well as shorten the communication which I have to offer on the subject, if I commence by dealing with the consideration of the pathology of a typical case of the disease, and especially with the conditions which determine or have most influence on the ultimate fate of the patient when treated by any of the means hitherto adopted.

Taking an ordinary case, then, the facts are as follows: Chest full of pus, lung collapsed and more or less covered on its surface with effused inflammatory products, which have the usual tendency of such products to become organised into connective tissue and to subsequent contraction; these changes only requiring time, and, when once attained, permanently disabling the lung, as, being bound down in a collapsed state, the function of this organ will remain ever after in more or less complete abeyance. But to return: An opening, we will suppose, is now made in the side; the pus is allowed to drain away through a tube long or short, air enters to displace the pus, and with each act of respiration is plainly heard to rush in and out; a washing, say twice a day, with some antiseptic solution is performed, but the rest of the progress towards recovery, or towards an opposite termination, as the case may be, is left entirely to time, except that sometimes the doubtful expedient of cutting through some of the ribs, with a view of helping the side to collapse, is resorted to. Then comes the question: How does time cure the case? Almost entirely by means of the chest-wall. This, under some influence not very apparent, is gradually forced down on to the immovable lung beneath, until ultimately it is sufficiently collapsed to obliterate the pleural cavity completely, that is, sufficiently to come into touch with the whole of the external surface of the lung; the secretion of pus now ceases, and consequently the opening made to drain it will close. Now, but not until now, with the closure of the opening, and so exclusion of atmospheric pressure, the chest-wall, in its endeavour to regain its former size and shape, gives the lung a helping hand, by attempting to carry it outwards with it. Of course this attempt, or this journey outwards, will be completely successful only where the lung is capable of full expansion, and where the chest itself has not been lamed by having had the ribs cut across in the previous treatment. In other words, then, the success of this endeavour will be almost entirely under the control of the very process which has been allowed to go on all this time undisturbed, namely, the organisation of the inflammatory products which were poured out on the surface of the lung during the initial attack of pleurisy, and, if this process has had time to develop firm adhesions, permanent contraction is the result, and the rule is to have deformed sides in prolonged cases.

Children easily and quickly recover, because their chest-walls, being more pliable than those of adults, more readily fall in; a child's side is soon seen to be greatly contracted; the opening then closes, and afterwards the normal size and shape of the thorax is quickly regained, simply because the lung is not given time to establish firm adhesions; the accommodating chest-wall comes down upon it, or into touch with it, too quickly, and so has afterwards no difficulty in carrying it out with it under atmospheric influence. In adults, however, and especially in the case of elderly people, the process is anything but so simple and favourable, and it is for their benefit especially that the valvular tube which I have devised, and commenced using towards the end of 1887, is recommended. The period taken by their unyielding chests to fall in is so lengthy, that a great proportion of such patients die of the exhaustive drain, or of its effects on other

organs, long before the stages these cases have to pass through are compassed.

The principle of the treatment by my valvular tube is the taking away of the atmospheric pressure from the external surface of the lung while the opening in the chest-wall still remains, and so enabling the organ to fulfil its functions and to fill up its side of the chest from the first, without waiting for any falling in of the side to take place; in other words, to cause the lung to expand at the commencement instead of at the end of the treatment.

The method of carrying out this principle is the following: A rubber tube a yard and a half in length, and of a thickness that will admit of its being introduced through a cannula of the ordinary size used to open empyemas, is taken, and one end is introduced into the chest by this means; over the tube, starting from the free end, is next run up an oval, slightly-curved—concave towards the chest—metal plate or shield, three inches by two inches, having a metal tube half an inch long soldered in a hole in its centre, and projecting on the convex side only; through this the drainage tube passes as the shield is run up to the chest, and they should, of course, fit each other air-tight. Now, between the plate and the chest stiff ointment on dressing, or a layer of soft rubber sheeting, or what not, is placed so as to form an air-tight joint, when the whole is finally firmly strapped down and bandaged. Turning again to the free end of the drainage-tube, we fix on to it by means of a piece of glass tubing a valve that opens outwards, and the contrivance is complete.

Many varieties of valves that answer extremely well are to be found in the rubber trade, and one that does as well as any other, and from which I first got the idea of a suitable valve—though not the first idea of the principle, which I had often thought of before—may be obtained from the air-bag of an ordinary spray-producer; others, again, are made by flattening chisel-shape one end of a short bit of thin rubber tubing.

The valve end of the tube when in use is placed in a bottle containing some antiseptic solution, as the valve acts best in a liquid, and the bottle forms a convenient and cleanly method of dealing with the discharge of pus. Lastly, once or twice each day the valve is removed and the chest washed out by simply elevating and lowering the bottle and changing its contents. It is essential that this should be done often at first, to thin the pus, which is then frequently very thick, presenting while in that state greater difficulties to its expulsion through the valve than when more fluid, and no obstacle should on any account be allowed to cause a postponement of the application of the valve for a single day.

By means of this mechanism the side of the chest acted upon is converted into the cylinder of a pump, of which the diaphragm forms the piston, having two exit openings, trachea and rubber tube, but only one inlet opening, trachea alone; therefore, each time the diaphragm ascends, the contents of the lung and also that of the pleural cavity are expelled; but each time the diaphragm descends only air into the lung can enter the chest; so each quantity of pus that is driven out through the tube during expiration is replaced at the next inspiration by so much re-expanded lung. By a repetition of this action the pleural cavity is ultimately pumped dry, and so the lung is made to reoccupy it; the action is, in fact, that of a continuous aspirator, and that it actually does take place is, I think, without doubt. It can readily be shown to occur under similar conditions by an experiment made with a contrivance consisting of a bottle with an open bottom, to which is attached a diaphragm of india-rubber, and which is closed at the mouth by a cork perforated by two tubes, to one of which is attached a bladder and to the other the valvular tube. Now, when the diaphragm is worked up and down with the hand, it will be seen that the expansion of the imprisoned bladder only takes place when the valve is *in situ*.

But, in addition to this experimental evidence, the following facts are, I think, proofs: At first the tube, if thin, will be seen to collapse during inspiration; again, the patients complain of a drawing sensation, and will often, if not watched, remove the valve, when they obtain immediate relief; lastly, the discharge of pus during the first twenty-four hours is infinitely greater than it is during any subsequent similar period, and with the fall of the discharge to an insignificant quantity the complaints of the drawing action of the valve will also cease to be made.

Of course, during the daily washings, as also during the renewal of the pad or dressings under the shield, the lung collapses somewhat for the time being; this is, however, of no importance.