

transmits them to man, one might cite the experiments of Silvestrini⁷ if they were not easily open to criticism. Silvestrini made subcutaneous injections into many subjects with dew collected from malarious districts and with the water which had washed the earth or mud from places celebrated for unhealthiness. Sometimes abscesses appeared at the point of injection, but he never obtained, out of a total of fifty-three experiments, one single case of malarial fever. Various criticisms might have been made on the way in which the author experimented; for example, the observation of inoculated persons was always continued for a shorter time than what was perhaps necessary. But certainly no one would wish, for obvious reasons, to repeat similar experiments on man to control the results of Silvestrini. If the results of this observer are tenable we should have to conclude that the germs of the infection contained in the ground and the water of malarious places are not directly inoculable into man, and perhaps the researches of Zeri point to a similar conclusion. Zeri, as I have related above, caused sixteen persons to inhale nebulised water from marshy places without any result. But, abandoning indirect arguments, in what way might one attempt an experimental study of the question? Three years ago, in company with Dionisi, I attempted what seemed to me the most direct method for arriving at a solution. We collected a great quantity of mosquitoes from the estate of Porto. We brought them to Rome and set them at liberty in the Hospital of Santo Spirito in a room occupied by a man in robust health who had consented to become the subject of experiment. Another similar experiment was made in the Hospital of San Giovanni. In the subjects experimented on no fever developed. One can only, however, assign very small value to this negative result. To begin with, the mosquitoes set at liberty in a room rapidly disperse, whatever precautions one may take, so that only for the first night is the individual who sleeps there bitten. Now I have already stated that in most cases it is necessary to spend several days in a malarious place in order to contract the fever. We have not succeeded in reproducing, therefore, in experimental conditions, even approximately, the natural ones. Also the direct study of the mosquito to discover whether elements which might be looked upon as malarial germs were to be found in its body has yielded me no result, although made with great patience. I think, however, that the want of success was to be expected, considering the difficulty of the research. The Texas fever is, as I have already said, a blood disease of cattle produced by an intra-corpuscular parasite which is inoculated into the animal by a special tick (*Boophilus bovis*, Riley). Smith and Kilborne, who have furnished a certain experimental proof of this fact, did not succeed in finding the parasite in the bodies of the inoculating ticks studied in all the various phases of their life.

Attempts to obtain a direct demonstration should again be made for malaria, but search should at the same time be made indirectly for a solution of the problem. This might be done, for example, by ascertaining whether a number of individuals under identical conditions of life as to quantity and quality of work, food, &c., took the fever in the same proportion when divided into two groups, one of them protected as far as possible from the bites of insects and the other not. It is certainly difficult to protect from suctorial insects, and only experience can teach the most effective way. One might experiment with various substances for driving the insects away, with the use of very thick mosquito nets and with perhaps other devices. It is known that those do not easily catch fever who inhabit the shepherds' huts, which are made in the form of a cone, with the hearth excavated in the ground in the middle and with an aperture near the apex of the cone, so that on account of the smoke the inmates are free from insects. One ought to ascertain whether those who cover their skins with chalk, as do the charcoal burners of Fiumicino to defend themselves from the coal dust, take the fever in the same proportion as others. It is known that carefully covering the skin keeps off the fever to a certain point; the inhabitants of malarious places never omit this precaution. I have heard it related by Professor Marchiafava that a Russian medical man he knew of considered it sufficient to cover the body completely, even to the face and hands, with woollen stuffs in order to escape the fever, and was so convinced of this that he himself always went to sleep in places subject to the severer forms of malaria protected by gloves and with a

kind of mask over his face; and he never took the fever. Everyone knows that the chilling of the body, and in general any disturbance of balance in the temperature, are amongst the most frequent and manifest occasional causes of the febrile paroxysm, but we cannot believe that these influences are sufficient to explain the above-mentioned facts. Numerous observations and experiments made on many persons systematically and with sufficient means of attaining one's object would be necessary for the solution of the problem. The task which I proposed to myself has only been to collect a series of facts which would demonstrate the probability of the hypothesis that fever may be contracted through inoculation. I consider that my work has not been in vain if the only result of it should be to enable some other observer whose attention has been called to these facts to clear the ground of this hypothesis by showing it to be false. To solve the question of how the fever is contracted is the step which I believe to be the most important that yet remains to be taken, because it would be the starting point for a rational prophylaxis of malaria. And to put us on the way to this result, which is the ultimate aspiration of all of us, even an error may prove useful. I wish, therefore, that those who have at their disposal the necessary means may take the study of the problem out of the field of theoretical discussion into that of observation and experiment.

TWO CASES OF PERFORATED GASTRIC ULCER SUCCESSFULLY TREATED BY ABDOMINAL SECTION.¹

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CASE 1.—The patient, a girl aged eighteen years, was suddenly taken ill on May 2nd, 1896, at about 10 A.M., whilst at business. She complained of intense pain in the upper part of the abdomen and a feeling of faintness. She went to bed and had some hot flannels applied. Feeling better the next day, Sunday, she went twice to chapel, and on the following day went to business. At 10 A.M. she was again suddenly seized with very severe pain in the epigastrium and became greatly collapsed. She was at once put to bed and soon after seen by Mr. Byrd of Pudsey. The patient was then in great pain. Her temperature was 96° F., and she was cold and sweating. A small dose of opium was given, and a hot fomentation ordered to be applied to the epigastrium. About 12 o'clock Dr. Hunter saw the case with Mr. Byrd, and after a consultation it was thought that an operation should be performed as soon as possible. I saw the patient about 4 P.M. and, agreeing with this opinion, made arrangements for opening the abdomen. At this time the patient had recovered to some extent from the collapse, the temperature had risen to normal, and the pulse was 120. The opium had relieved the pain. The abdomen was greatly distended and resonant; there was resonance over the hepatic region in front. The breathing was thoracic. The diagnosis made was that some peritoneal catastrophe had occurred, probably the perforation of a gastric ulcer. The operation was commenced about 5 P.M. Mr. Byrd gave the anæsthetic (ether) and Mr. Walter Thompson and Mr. F. Squire kindly assisted me. As the hot fomentations applied to the epigastrium had produced a huge blister in this region, and one was not absolutely certain of the diagnosis, an incision was made in the middle line just below the umbilicus. On opening the peritoneum some odourless gas at once escaped and the omentum presented; this was inflamed and in it in parts there were patches of purulent lymph. The free edge of the omentum was turned up and revealed some coils of small intestine; some of these were found distended and on them were small flakes of purulent lymph, but the greater part of the small intestines were collapsed; the large intestine was contracted and contained a great many scybalous masses. The pelvis and cæcal region were explored and nothing abnormal was found; a sponge was then packed into the lower part of the abdomen and the incision prolonged upwards for about four inches in the middle

¹ A paper read before the Leeds and West Riding Medico-Chirurgical Society on Oct. 16th, 1896. The patients and specimens were shown at the meeting.

⁷ La Malaria. Lezioni. Parma, 1885.

line. A small perforated ulcer was soon found in the anterior wall of the stomach, apparently situated about equal distance from the two curvatures and nearer the pyloric than the cardiac orifice; from the perforation the fluid contents of the stomach were welling up and running over the omentum and down into the right side of the abdomen. There was purulent peritonitis; this was chiefly limited to the anterior surface of the stomach, great omentum, some of the small intestines in contact with its under surface, and the viscera on the right side of the abdomen. These parts were all carefully sponged, the sponges being washed in boiled salt solution. The ulcer was then excised by an elliptical incision and the aperture closed by five fine silk Lembert's sutures. The perforation was about one-tenth of an inch in diameter. At this stage the patient became very collapsed, so the anæsthetic was discontinued and some brandy given hypodermically. The parts affected by acute peritonitis were again carefully sponged and a large Bantock's tube put down to the right side of the abdomen and the abdominal wound sutured. Nothing was given by the stomach for the first week; the patient was fed every four hours by the rectum with peptonised milk and a small quantity of brandy. The mouth was washed out frequently. After this she was fed by the mouth—at first small quantities of milk and water, then Benger's food, &c. There was never any vomiting. The tube was emptied at first night and morning and then more frequently; the discharge was at first blood-stained and turbid, later becoming purulent. On May 11th the glass tube was removed and a rubber tube inserted and the abdominal wound was dressed: it was practically healed. The large area of scald was healing; it was dressed with some iodoform ointment. On the 13th the patient was not so well; she complained of a good deal of abdominal discomfort and at night a considerable quantity of foul-smelling discharge escaped through the tube. The next morning the cavity was well syringed out with a solution of creolin, and this was repeated every two hours. Within forty-eight hours the discharge had greatly diminished and become sweet. The tube was finally removed on May 20th and the wound healed a few days later. The scald had healed by June 14th. On May 21st she complained of pain in the right lower limb along the course of the femoral and popliteal veins and there was some swelling of the foot. The temperature rose to 102°. This was probably due to thrombosis. On the 23rd the pain in the limb was less, but the swelling had increased; after this the swelling slowly subsided and the pain disappeared. On the 28th the patient sat up for one hour in bed, and did so—increasing the time—every day until June 11th, when she got up for an hour. After this she got up every day. The temperature ranged between 99° and 102°, was normal on May 28th, and remained so after that date. The patient had suffered for four or five years from troublesome dyspepsia.

CASE 2.—The patient, a girl aged eighteen years, was suddenly taken ill whilst at business at 9 A.M. on July 21st, 1896. She was seized with intense pain in the abdomen and was greatly collapsed. About an hour later she was seen by Mr. Woodcock of Holbeck; she was then in great pain, and the extremities were cold, sweating, and blue. She was put to bed and a small dose of morphia was given to relieve the pain. Diagnosis of perforated gastric ulcer was made and arrangements made for operation. Some time previously Mr. Mann of Holbeck had on two occasions attended her for very profuse hæmatemesis. I saw her with Mr. Woodcock at 2:30 P.M. She was then greatly relieved, and recovering from the collapse. The pulse was quick, but of good quality. Respirations were entirely thoracic. The abdomen was distended and resonant. There was resonance over the hepatic area in front. She complained of some pain in the abdomen, which was most marked in the lower part of the umbilical region. Agreeing with the diagnosis I commenced to operate at 3 P.M., assisted by Mr. Woodcock and Dr. Macphail. Ether was administered, and the abdomen opened in the middle line just above the umbilicus. Some odourless gas escaped on opening the peritoneum and some yellowish-white semi-purulent fluid. This opening exposed a perforated gastric ulcer, which was situated in the anterior wall of the stomach near the lesser curvature, and about three inches from the pylorus. The aperture of the ulcer was about one-third of an inch in diameter, the edges were greatly thickened, and near the right side of its edge was a strong fibrous adhesion fixing the stomach to the anterior abdominal wall. The ulcer was excised by an elliptical incision and the edges of the opening sutured by seven fine silk Lembert's sutures, including the

whole thickness of the gastric wall with the exception of the mucosa. The peritoneum was carefully wiped out with sponges wrung out in sterilised salt solution. The anterior wall of the stomach, the great omentum, and the viscera on the right side were the parts over which the fluid contents of the stomach had been mainly distributed. These parts were roughened and injected and in several places there were flakes and patches of purulent lymph. There were several small purulent nodules in the omentum; some of these were wiped off, some removed with the nail, and others must have been left behind. A large size Bantock's tube was placed down to the right side of the abdomen and the incision closed in three layers, fine silk being used for the peritoneum and muscles and silkworm gut for the skin. The patient stood the operation well. A brandy enema was given as the abdominal wound was being stitched up. The after-treatment was carried out by Mr. Woodcock. The Bantock's tube was emptied at first every four hours, a few drachms of serum being removed each time. On the eighth day the fluid removed was purulent, but smaller in quantity. On the tenth day the sutures were removed from the abdominal wound and a rubber tube substituted for the glass one. At this time the patient was suffering from considerable pain in her left shoulder, for which morphia was given hypodermically; this had to be repeated for several days. For ten days she was kept without swallowing anything; the tongue, mouth, and lips were moistened frequently. After this she was allowed water to drink and then milk. Rectal feeding was carried on for the first fortnight. At the end of the fourth week the drainage-tube was taken out and at the end of the fifth week the abdominal wound had healed. She was then allowed to get up. The temperature ranged between 100° and 103° until Aug. 1st; from this date until Aug. 13th it varied between 98.4° and 99°, and after that was normal.

The records of successful cases of this kind are fortunately daily becoming more common; they are still, however, I venture to think, sufficiently rare to make the present cases of interest. The most important factor contributing to a successful result is undoubtedly an early diagnosis, so that the operation can be performed within eight or ten hours of the rupture. In these cases the skilful diagnoses of the medical men in charge enabled me to do this. The best way of treating the ulcers is a point for discussion. In these cases excision was very quickly and easily done, and it appears to me to be an advantage if possible to remove the edges of the ulcer, especially if they are at all indurated. I can quite conceive cases in which excision may not be practicable and one must be contented with inverting the edges and bringing the two serous surfaces in contact. The treatment of the peritoneum when there is purulent peritonitis is still under discussion. Should you wash out? Should you wipe out? Whichever plan you adopt it appears to me a physical impossibility to thoroughly cleanse the peritoneum. In both these cases the omentum was infiltrated with small purulent nodules, and certainly some septic material was left behind. Up to a certain point I imagine the peritoneum is capable of dealing with this. Another point for discussion is how soon should you give fluids and foods by the mouth. Some surgeons begin to feed much earlier than I did in these cases, and perhaps they are right. In the first case recovery was retarded by thrombosis of the right femoral vein, and similar complications have occurred in some others of the successful cases which have been recorded. What the explanation of it is I do not know. I have seen it after other abdominal operations.

I have to thank Mr. Byrd and Mr. Woodcock for their notes of the after-treatment of these cases, and I cannot conclude without a word of praise for the nurses who helped at the operation and attended to the after-treatment of the cases and so largely contributed to the successful results in surroundings which were by no means the most favourable.

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RABIES AND MUZZLING IN SURREY.—The Surrey County Council last week discussed the question of abolishing or relaxing the muzzling order. The committee had heard that London and Middlesex had no intention of taking the former course, and having regard to the fact that during the past quarter there were in Surrey fourteen suspected cases of rabies, of which six were confirmed, declared their inability to at present relax the order. In future notice is to be sent to the district councils concerned of any case in which a human being has been known to have been bitten by a dog suspected of being affected with rabies in their district.