in which the incision is made. It then, in the cases reported, was said and supposed to be impossible to find the colon from the lumbar region.

The last two examples show how imperative it is to make sure that it is the large and not the small intestine, or even the stomach, which is going to be opened. At the risk of reiteration I must impress upon my readers the necessity of following the lines laid down for ascertaining that it is the large intestine which the operator is bringing to the loin. The presence of the appendices epiploicæ may also inform the surgeon that he has found the large intestine, but I do not consider these as so important as the longitudinal bands, since the appendices may not always exist on the piece of large gut brought to view. Bearing in mind these anatomical facts, we must now consider how they may be dealt with successfully.

In a case represented by Diagram 1, after exposing a piece of intestine, and failing to see a longitudinal band, I make a small incision into the peritoneum, and convince myself, by finding a band, that it is the large intestine. The posterior part of the intestine is then taken hold of, drawn to the surface of the wound (the gut being pulled out as far as possible, so as to obtain a good spur), and carefully stitched with interrupted sutures all round to the edges of the skin, without perforating the mucous lining. The intestine may then be left unopened for some hours, or, if necessary, opened at once, provided that it is carefully attached at every point to the surrounding edges of the wound.

When a condition occurs, as is represented in Diagram 2, of course in the first place a sufficient search should be made for the gut about the subperitoneal tissue, under the assumption that it is in its normal position; but should this search fail, all the loose pieces of fat must be sponged out of the wound, and the peritoneum at the anterior angle of the wound, deliberately opened (and the edges clipped), just sufficiently to admit the index finger. This finger I pass towards the vertebræ, and then sweep it over the front of the kidney and quadratus lumborum, and the gut, although it be in the position represented in Diagram 2, can be easily felt, hooked up, and the longitudinal bands seen. I then open the peritoneum to the extent of the wound, and introduce a sponge, with string attached, to keep the intestine out of the way while the edges of the cut peritoneum are drawn up and sutured to the skin in the manner I adopt in inguinal colotomy. This entirely shuts off the cut abdominal muscles from the peritoneal cavity. Occasionally this stitching is not easy to do, either on account of the depth of the wound, or from the firm adherence of the peritoneum to the abdominal wall. The rest of the operation is completed in the usual way, as described in Case 1. Here, if the mesentery be sufficiently long, a stitch may be passed through it, fixing it to the surface of the wound; thus a good spur is obtained.

In dealing with the third position, as represented in Diagram 3, after proceeding in the manner described in Cases 1 and 2, and failing to find the colon, I then enlarge the external wound forwards and backwards sufficiently to admit the hand. I next open the peritoneum to a corresponding extent, and, having well cleaned the hand, I introduce it into the abdomen. If it is the left colon that is to be operated on, I first pass the hand upwards towards the spleen, and feel for the splenic flexure. Hereupon I draw the hand down the intestine until the piece opposite the wound is found and brought to the surface. Failing to find the intestine at its splenic bend, I pass the hand towards the rectum or across the abdomen (keeping the back of the hand in contact with the posterior aspect of the anterior abdominal wall), towards the hepatic flexure, and then slip the hand along the large intestine, and draw a piece to the surface. Of course I take care to ascertain that this piece of intestine has the characteristic longitudinal bands. By these means I have never found any difficulty in finding the colon.

When the large intestine is found, command it with forceps that will not perforate the gut, and introduce a sponge to keep the small intestines, which may prolapse, out of the way while the wound is treated as follows. At the anterior and posterior parts, if the incision is six inches long, two inches in front and two behind should be dealt with as in an ordinary case of abdominal section, by passing the suture through the skin and peritoneum, so as to bring the cut peritoneal edges in contact. But at the middle two inches of the wound where the intestine is to be brought up to the surface, the peritoneum should be sutured to the skin as described in Case 2, and the operation completed in the same way. In this third condition a good spur can and should always be made, and when the gut is opened its promi-

nent edges ought to be cut away in the manner I suggested in my paper on inguinal colotomy.

I cannot help thinking that the above described methods of treatment must have occurred to, and been used by, some surgeons when performing lumbar colotomy.

I am much surprised, considering the frequency of the operation, that these details are so little known, or, at any rate, practised. Yet, as far as I am aware, no account of these important details in finding or treating the large intestine from the loin has, up to now, been brought before the profession. This silence on the subject has encouraged me to express my views, and I am confident that I shall never undertake this operation with any fear of failing to find the colon. I do not at all advocate lumbar colotomy when it is possible to perform the inguinal operation, for the lumbar is certainly the more difficult; the patient runs greater risks and recovers with less rapidity, and the after results are not so satisfactory. Nevertheless, for those surgeons who persist in the lumbar operation, and in cases where the obstruction is at the upper part of the sigmoid flexure or in the transverse colon, I hope that these remarks may assist in simplifying the supposed difficulties, and minimise the mistakes not infrequently made.

SUCCESSFUL EXTRACTION OF A PIECE OF GLASS FROM AN EYE WHERE IT HAD LODGED FOR MORE THAN TEN YEARS.

By T. H. BICKERTON, M.R.C.S.,
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HAVING, in the literature of ophthalmic surgery, been able to find but four cases mentioned¹ where glass has been found in the anterior chamber of the eye, a record of the following case may not be without interest.

Mr. H. T., aged 29, was, more than ten years ago, watching closely the manufacture of oxygen. Suddenly the glass retort burst, and, on Mr. T. recovering himself, numerous pieces of glass were found sticking in his face; his lip was cut in two, and he could not see well with the left eye. Owing to a severe corneal wound, he was for a fortnight kept in a darkened room, for three weeks longer he had a bandage over both eyes, and for about six months he wore dark protectors. The following is his statement as to the progress of affairs:—"My eye gradually got better; useful sight was regained; and for years it gave no trouble, though in cold winds it used to inflame now and again. Within the last four years it has given more trouble, but this was ascribed to a granular condition of the lids, and rubbing with blue stone gave relief. Still there was always a red look about the eye. In a fierce sun it was weak, and often, when playing tennis, it would water much and become red and irritable. Once, when bending over a dog, he suddenly jumped up, and his nose coming in contact with my eye caused pain. This year I have played tennis vigorously, and found the eye getting more and more red and irritable; and the local application of the blue stone, which up to this attack had always given relief, was now of no benefit."

On July 15th, 1887, the condition was as follows:—Right eye, V. $\frac{1}{2}$, J. i, normal in all respects; pupil $4\frac{1}{2}$ m. Left eye, V. $\frac{1}{2}$.

I letter J. i; small brownish corneal cicatrix below and to the inner side of the centre of the pupil, to which a tag of the surface of the iris (not the pupillary margin) adheres, and from it a faint, cicatricial line runs up to the centre of the cornea; pupil $2\frac{1}{2}$ mm and slightly irregular; iris acting well to light; lens normal. Lying at the bottom of the anterior chamber, not quite horizontal, but tilted up to the outer side, can be seen, on careful oblique illumination, a foreign body, which is indistinguishable in certain positions, but which, when the eye is so directed as to allow the light to fall on its margins, can be seen readily. It lay in the

¹ Theobald, *von Graefe's Archiv*, vol. xxx, p. 2⁶; Ammon's *Zeitschrift*, vol. iii, p. 103; Critchett, *Moorfields Reports*, vol. i, Ferguson, *Ophthalmic Review*, vol. iv, p. 293.

sinus between the cornea and iris, and was not imbedded in the latter. The iris in its neighbourhood seemed to be slightly muddy, but this appearance might have been due to a condition of the cornea or aqueous humour. The ocular conjunctiva around this part of the cornea was very hyperæmic, and it had slightly encroached upon the cornea. There was also localised ciliary congestion. The attacks of irritation could now be accounted for on the supposition that the active exercise—tennis, shooting, riding, etc.—in which Mr. T. engaged caused some slight movement of the glass; and he could now recollect that each fresh attack had followed exercise.

A quiet life was advised, and in two months the muddiness of the iris and the ciliary congestion had disappeared, and much of the conjunctival redness had gone.

On September 12th, 1887, the operation was performed; and I may here thank Dr. Fox, of Philadelphia, an old Moorfields friend, for the good advice and able assistance he gave me. Eserine having been freely applied, in order to cause firm contraction of the iris, and the eye placed thoroughly under the influence of a 20 per cent. solution of cocaine, a horizontal, purely corneal incision was made by puncture and counter-puncture with a Graefe's knife across the front of the cornea, at the junction of the lower third with the upper two-thirds, the aqueous being allowed to escape slowly. A curette was then introduced between the lips of the wound and passed on in front of the iris to a position behind the foreign body, in order to fix it. This being done, a pair of fine forceps was introduced to the bottom of the anterior chamber, and the glass, being seized at the first attempt, was removed entire. At the moment of withdrawal a speck of blood appeared on the surface of the iris, evidently being due to its having been pricked by a fine needle-like point which projected from one of the ends of the glass. Iced compresses were applied, and the eye made an uninterrupted good recovery, though, in spite of frequent instillations of eserine, a slight adhesion took place between the surface, not the pupillary margin, of the iris and the outer part of the corneal incision.

Two months after the removal all conjunctival redness had gone; the pupil was almost regular, and had increased in size to $3\frac{1}{2}$ mm. Vision $\frac{1}{2}$ 4 letters, J. i.

The glass measures in its greatest length $4\frac{3}{4}$ mm., in its shortest length $3\frac{3}{4}$ mm. It is 1 mm. in breadth, and $\frac{3}{4}$ mm. in thickness.

A NOTE ON THE CONDITION OF THE BLOOD IN MALARIA.

By J. F. EVANS, SURGEON, I.M.S., MANDALAY.

MALARIAL fevers have naturally always obtained a great deal of attention from medical men throughout the Indian Empire. In 1886, according to Surgeon-General Thomson's report, one-fourth of the admissions to the European military hospitals of the Bombay Presidency were for this disease. But, while the mortality is rarely high, the debility that results from repeated attacks is a much more serious matter. Englishmen who have been living in a malarious climate occasionally suffer from ague after their arrival home, pointing to some effect on the tissues persisting subsequent to exposure. An officer who had been some years in India told me that his first attack of ague was when taking his first leave home.

It may be that malarial poisoning is a gradual process, and that a condition of semi-tolerance is established, and that the chill or exposure, of which Dr. Oldham writes, is the immediate exciting cause. In 1879, Klebs and Tommasi-Crudeli professed to have successfully inoculated rabbits with malarial fever, and to have discovered the bacillus malarie; their experiments do not seem to have been confirmed by other observers. Marchiafava and Celli, in 1885, published a detailed account of the changes observed by them in malarial blood, with which the later researches of Dr. Laveran in great measure coincide (*vide* BRITISH MEDICAL JOURNAL, October 29th, 1887). There has of late, in the military hospitals of Mandalay, been a wide field for research into the pathological changes induced by malaria. I have never examined a single specimen of blood taken from a patient suffering from ague or remittent fever without finding some definite change.

The following are the changes observed by me:

1. In health the red blood cells are with difficulty stained by an aniline dye, but, after even a single attack of ague, the red blood cells can be readily stained by an aniline solution of gentian

violet; a small area, however, in most being left unstained. This unstained area is not constant in size, nor in its position in the corpuscle, in some involving nearly the whole corpuscle, in others so small as to be easily ignored. In specimens of unstained blood I have recognised the hyaline material replacing the hæmoglobin of the red corpuscles, as described by Marchiafava and Celli, who state that this hyaline material can be readily stained with methyl blue; but hitherto I have not been successful in obtaining this reaction. The globule of new hyaline matter in the red corpuscles can be seen slowly to change its shape from time to time, which Marchiafava and Celli pointed out. Whether this hyaline material coincides with the unstained area, I am not at present able to decide. In cases of malarial cachexia, the softening and crenation of the red corpuscles is a marked feature; in such cases, it is difficult to find in a specimen of blood a corpuscle with normal outline. This crenation is certainly more marked in the blood of natives than in that of Europeans, and may be due in part to the deficiency of nitrogenous matter in their diet. It is due probably to a gradual loss of the cell contents, and may serve to account for the intense anæmia that occurs in malarial cachexia. The red corpuscles are not only altered in structure by this disease, but are absolutely destroyed in the process; they can be seen in every stage of destruction, from mere erosion of the margin to almost complete obliteration, a thin semilunar rim of pellicle being left. As might be expected in blood undergoing a process of slow deterioration, small free masses of pigment are often met with.

2. In addition to the structural changes already mentioned in the blood-corpuscles, I have found free spherical bodies in the serum and in the corpuscles. These spherical bodies are possessed of movement, both rotatory and from place to place. They are of two perfectly distinct kinds, and I shall, for purposes of description, describe them as nucleated and non-nucleated, although not considering the nuclear body of the nature of a nucleus:

a. The non-nucleated spherical bodies are dark in colour, of the same consistence throughout, and about $\frac{1}{10}$ th to $\frac{1}{8}$ th the diameter of a red corpuscle (that is to say, 0.2μ to 0.3μ in diameter). They are to be met with either moving freely about in the serum, or else stationary inside the red corpuscles; when immured in a red corpuscle they as a rule remain fixed, but rotatory movements are to be observed sometimes. Three or four of these bodies generally occur in the same corpuscle together, beneath the pellicle, at one point; they frequently occur in the corpuscles undergoing the hyaline degeneration noted by Marchiafava and Celli, and also in those cells where this degeneration cannot be distinguished. I have never seen any of these organisms inside a white blood-corpuscle. I have found them in the serum and red cells of the blood of men suffering from beri-beri; and similarly in the serum and red cells of the blood of horses suffering from *surrah*, in company with Surgeon Hendley, who tells me that he has observed similar bodies in the blood of rats, and of a dog ailing with fever. More numerous and more freely movable than the nucleated spherical bodies, it is only possible to suggest that they may have some relation to the nuclear-like bodies of the latter, although up to the present this has not been traced.

b. The nucleated spherical bodies are of a greenish-yellow tint, circular single contour, brighter than the red corpuscles, and with a highly refractive outline; varying slightly in size, they are about $\frac{1}{10}$ th to $\frac{1}{8}$ th the diameter of a red blood corpuscle (about 1μ to 0.7μ). The nuclear-like body can be easily distinguished inside the sphere, which is often little more than an enclosing capsule. Like the spherical body in which it is enclosed, this nucleus has free rotatory movement.

The nucleated, like the non-nucleated bodies, have movements rotatory and from place to place, though not so freely as the latter; they are also not so numerous, but, like them, are found floating freely in the plasma and stationary in the corpuscles. They usually occur singly in the blood cells, and I have seen them occasionally in the white blood cells as well as in the red. They often occur with the non-nucleated in the same red corpuscle; but I have never found them in corpuscles undergoing the hyaline degeneration. My first acquaintance with these nucleated spherical bodies was in the blood of horses suffering from *surrah*, where they occur like the non-nucleated. I have not seen them, however, in the blood of beri-beri, where the non-nucleated occur, and in which disease, on two occasions quite recently, I have found a streptococcus, in chains of three cocci each, not very unlike the cocci occurring in *kumri*. The appearance of these nucleated spherical bodies would justify the assumption of their being monococci. I have not yet, however, succeeded in staining them. Accordingly,