Operation.—The gravity of the case was pointed out to the patient and to his parents. Consent was obtained to an attempt to remove the foreign body with the electro-magnet, and the operation was performed on November 9th. The site selected for incising the sclerotic and introducing the electro-magnet was between the external and inferior recti; indeed, a little external to the latter appeared the best situation from which to at once advance the point of the electro-magnet to the location of the foreign body. Cocaine was therefore instilled, and the conjunctiva separated from a point in front of the intended puncture back towards the equator. After bleeding was stopped the sclerotic was incised, and the point of the electro-magnet was introduced and advanced to the situation of the foreign body. A second introduction was necessary, and then the piece of steel was extracted; it weighed 0.16 gr. One surface was coated white, and this demonstrated, if further testimony were necessary, the fact that it had been situated as diagnosed, one surface lying in the retina and the other coated over with effusion. The conjunctiva was united by sutures.

After-History.—The recovery was uninterrupted. It is noted on December 16th that there is still a whitish mark where the foreign body was situated, and pigment is becoming deposited in the neighbourhood. Vision = $\frac{5}{2}$, and the slight alteration in the field of vision, as shown by the accompanying perimeter chart, illustrates how complete has been the restoration of vision.

This was the second instance during the year 1898 in which a splinter of steel, diagnosed as being embedded in the retina by the ophthalmoscope, has been successfully removed by me with the electro-magnet. The previous case is recorded in vol. xviii (1898) of the *Transactions of the Ophthalmological Society*, and reference is also there made to an earlier case of removal of a piece of metal from the retina by me, and to instances recorded by others. The other instance under my care last year very closely resembles that related in the present article.

CASE II. Removal of Fragment of Steel from Retina: Lenticular Opacity: Vision $\frac{5}{2}$.

History of Injury.—The right eye was injured; the splinter of steel had entered at the sclero-corneal junction at the inner side (not outer), and there was a hole in the iris through which it had passed, and the track the foreign body had taken was made out by the opacity it had caused at the periphery of the lens. Examination with the ophthalmoscope disclosed the fragment of metal fixed in the retina in the lower and outer quadrant. The glistening of the steel was distinct, but it was surrounded and partially covered by whitish exudation. The vitreous otherwise was but little disturbed, and vision equalled about fingers.

Operation and Result.—The sclerotic was incised between the internal and inferior recti, and the electro-magnet was advanced to the situation of the foreign body. On withdrawing it the foreign body was not attached. Again the electro-magnet was passed into the eye and a click was immediately heard, but with a like result. A careful search was made round the wound to ascertain if the splinter had been peeled off when the electro-magnet had been withdrawn, but it could not be found. A third time the electro-magnet was advanced to the situation of the foreign body: a click was again heard, and this time on withdrawing the instrument the piece of metal was found adhering to it. The exact situation of the fragment in the retina had been ascertained, but the splinter was clearly too firmly fixed, either in the retina or glued by adhesions of lymph, to be detached at the two first occasions it was brought into contact with the electro-magnet. The opacity in lens remained unaltered and vision = $\frac{5}{2}$.

It has for some years been recognised that foreign bodies

may be tolerated for lengthened periods in the fundus oculi with retention of vision. I recorded such an instance in 1878 in the *Royal London Ophthalmic Hospital Reports*,⁴ and have reported several instances since,⁵ and others, including Knapp, have done the same. Such a case as I have recorded in this paper, together with the other similar instance I have mentioned, very properly raises the question whether foreign bodies so situated should be left alone or surgical interference adopted. My feeling with such evidence before me is naturally more in favour of interference than it was formerly. But it must be recognised that the fixation or embedding of a foreign body is always a hindrance to its removal by the electro-magnet. In each instance the possibility of success must be carefully weighed, and it is important that the situation of the fragment be exactly located, so that the point of the electro-magnet be advanced immediately to it, and thus the prospects of its successful removal be materially increased.

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A CASE OF PROFUSE SPONTANEOUS HÆMORRHAGE INTO THE URINARY BLADDER.

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VESICAL bleeding may arise from a variety of causes, and blood may reach the bladder from the surrounding structures, but in the majority of instances the amount that is found at any one time in the cavity of the viscus is but slight. Profuse hæmorrhage, leading to a collection of blood so as to distend the bladder, is not a very frequent occurrence, and when it does take place is not altogether simple in its treatment. Such loss of blood into the organ is usually the result of the presence of a papilloma of the vesical wall, but the bleeding may be the outcome of operative interference, or it may be spontaneous.

Malignant disease sometimes causes much hæmorrhage, so likewise a congested prostate. Operations, such as lithotripsy and suprapubic cystotomy, are occasionally followed by considerable bleeding. Possibly also hæmophilia must be included as a cause, but it is not usual to get great loss of blood in cases of rupture of the viscus.

The record of the instance of profuse spontaneous hæmorrhage into the bladder which is here given is chiefly of interest from the point of view of treatment.

History.—A man, aged 45, was admitted to the West London Hospital on August 20th, 1898, and gave the history of his condition briefly thus: He was a ship-yard painter and had been engaged in painting in a confined place for twelve hours nearly continuously. At the expiration of this time he found that he was unable to pass his urine, although up to this period he had never experienced any difficulty whatever in micturition, and there had not been, as far as he knew, anything abnormal with his water, he being especially confident that he had never passed any blood with it.

Soon after the inability to relieve his bladder came on he began to have a severe pain in the hypogastric region. He returned home, and still being in distress he was seen by his medical man, who passed a catheter with ease, but failed to draw off more than a few drops of blood. The patient was therefore at once sent into the hospital.

Condition on Admission.—When seen there he was evidently in great agony, somewhat collapsed, and distinctly anæmic. On examining the abdomen I found an oval swelling reaching upwards to the level of the umbilicus. This was easily palpated and could be even seen, the patient being of spare habit. The tumour was dull to percussion, but had a rather more firm feel than is usual with a bladder distended with urine. No fluctuation was obtained. The pulse was weak and rapid. A full-sized catheter was passed without difficulty, being introduced its whole length, but only evacuating a small quantity of blood. The finger inserted into the rectum did not reveal that the instrument had transgressed the urethral canal, and there was no evidence of free fluid in the peritoneal cavity. It was concluded that the case was one of profuse hæmorrhage into the bladder, and I therefore decided to explore the interior of the viscus from the perineum.

First Operation.—Accordingly, a medium perineal section was made and a catheter introduced through this opening into the bladder. This, when it had passed for nearly its full length, drew off about a pint of highly blood-stained urine, and at the same time the hypogastric swelling considerably diminished, but did not entirely disappear. The blood clot which was in the bladder was as far as possible removed by irrigation, yet it was clear that all had not been evacuated. The introduction of hot water checked the hæmorrhage almost completely, and a catheter

having been tied in the patient was sent back to bed. About four hours later it was found by the house-surgeon that bleeding had recommenced and that the hypogastric swelling was already again in evidence.

Second Operation.—I was sent for, and on arrival an hour later determined that the right line of treatment would be to open the bladder in the suprapubic region. This revealed a mass of blood clot within the viscus, which was speedily scooped out with the aid of a spoon. Search was then made for a bleeding area, but as the blood welled up from the position of the trigone, and rendered a clear view impossible, pressure was exerted on the abdominal aorta which effectually controlled the loss. Even then no place from which blood had actually flowed could be seen. No papilloma, or remnants of one, nor any other growth could be discovered, though it is possible that in the manipulations employed in the removal of the blood clot some villous mass may have been dragged off. Removal of the fingers from the aorta immediately caused a renewal of the hæmorrhage, the blood, as has been said, welling up from about the internal meatus. Water at a temperature of 120° F. was then run through the bladder, and was successful in bringing about a cessation of the bleeding. A glass tube was inserted through the suprapubic wound into the bladder, and the patient returned to the ward.

After-History.—During the ensuing night he had much pain, and the urine that drained from the pubic opening was at times very considerably blood-stained. Hæmorrhage occurred at intervals for three days, after which it entirely ceased. The suprapubic tube was removed on the fourth day and the catheter on the seventh day. There was rapid healing of both the wounds, and the patient left the hospital but little the worse for his severe hæmorrhage on September 7th, eighteen days after admission.

This case is a good example of spontaneous and profuse bleeding within the cavity of the urinary bladder. Most probably this was the result of some laceration of a papillomatous growth, which was not discovered at the time of the suprapubic opening, but which may have been successfully, though unintentionally, removed at that time.

I have to thank my late house-surgeon, Mr. W. T. Rowe, for the excellent notes that he took of the case.

FORMALIN IN THE TREATMENT AND REMOVAL OF INOPERABLE MALIGNANT GROWTHS.

By WILLIAM MITCHELL, M.B., C.M. EDIN.,
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THE treatment of malignant growths, which either on account of anatomical peculiarities or of the constitutional state of the patient, or on account of the refusal of the latter to submit to the knife, cannot be treated by ordinary operative methods, must at times be a source of trouble and perplexity to almost every surgeon; and any method which will enable us to deal with such cases in a simple and reasonably satisfactory manner will be welcome to most.

The method adopted in the following case might, I venture to hope, prove a useful addition to methods already in use. The patient had a sarcoma of the cheek (second recurrence) which two experienced surgeons refused to remove by operation. When she came to me the tumour was 4 inches in diameter, and fully as large as a man's fist. At one place a mass of sarcomatous tissue had forced its way through the integument, and was giving rise to constant and rather severe hæmorrhage. It was this latter symptom I was now called upon to treat.

I tried all the usual styptic methods, but with none of them succeeded in stopping the hæmorrhage for more than a few hours, so that 2 or 3 ounces of blood were being lost daily, and it seemed as if nothing short of tying the external or common carotid could arrest the bleeding.

Remembering, however, the great power of penetration and coagulation possessed by formalin, and the rapidity of its action in this respect on dead tissues, I determined to try its effect on the living. After applying a solution of caoutchouc to protect the surrounding skin, I soaked a small pad of absorbent cotton wool with a solution of formalin containing 20 per cent. of formic aldehyde, and applied this to the raw surface, then covered it with guttapercha tissue, and held it in place with a bandage.

My expectations were more than realised; for not only was the hæmorrhage entirely stopped, but in 24 hours there was produced a hardening and necrosis of the tissues, extending nearly a quarter of an inch from the surface.

This made me think that it might be possible to remove the whole growth by first coagulating the tissues with formalin and then cutting away some of the necrosed part daily, always however leaving sufficient of the latter to prevent a recurrence of hæmorrhage. I therefore scooped out with a scalpel and

sharp spoon as much of the necrosed part as I dared, and then filled up the cavity with cotton wool saturated with the formalin solution as before. Daily repeating this I was able in a very short time to tunnel right into the centre of the tumour, and eventually to remove it completely, notwithstanding that it was highly vascular, and during the process there has not practically been one drop of blood lost.

The formalin seems to exert its influence equally in all directions, and to be capable of penetrating to almost any depth if constantly applied. I have cut out a solid piece an inch in thickness at one time, although I have usually contented myself with less. On one occasion I cautiously tried injecting some of the solution into the tumour with a hypodermic syringe, but gave it up as I was afraid of producing embolism, and it gave no better result. The pain has occasionally been pretty severe, but has been held in check by small doses of nepenthe.

There has occasionally been considerable œdema of the lower eyelids and lips, and on one occasion of the cellular tissues of the neck. This caused me to suspend treatment for a few days, lest it should cause œdema glottidis. There has, however, never been any sign of such a condition. When the application of formalin is suspended for a few days, a line of demarcation forms with exactly the appearances seen in dry senile gangrene of the extremities.

To sum up, I consider the points in favour of this method are as follows:

1. It is simple in the extreme, requiring no special apparatus, and can be applied without an anæsthetic.
2. It produces no shock.
3. It does not, like electrolysis, set up a diffuse suppurative process, being not only aseptic, but powerfully antiseptic.
4. It is bloodless, and can be applied to very vascular growths, as this case shows.
5. It has very much greater penetrating power, and hence effects a more rapid removal than the usual escharotics, and its application does not like those give rise to a disintegrative or caustic process, with the resulting discharge, but is what I might term a necropoietic process, and with no discharge whatever.
6. As there is no discharge scarcely any dressing material is required, and an economy is thus effected.
7. During the paring away of the necrosed parts the macroscopic limits of such a tumour can be easily seen on the dry clean-cut surfaces, and an indication is thus given as to the direction in which it is necessary to proceed further. The pieces removed can be subjected to microscopic examination for the same purpose.
8. Above all the process appears to be efficient and safe if care is taken.

The drawbacks are: (1) The pain, which is at times pretty severe, but can of course be relieved by an anodyne; and (2) the œdema, which is always annoying, and might if extending to the glottis be fatal.

The systemic absorption of the formalin is apt to, and in this case did, produce an annoying general urticaria, thus showing its relationship to formic acid. There was at the same time a slight rise of temperature. The urticarial irritation was easily subdued by carbolic acid lotion.

THE TREATMENT OF TRAUMATIC TETANUS WITH ANTITOXINS.

By STANLEY COPLEY, M.R.C.S., L.R.C.P.,
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DURING the past two years I have had the opportunity of observing and treating 4 cases of traumatic tetanus. In all of them the symptoms were well marked, the spasms severe, and in all 4 there was a definite wound in a septic condition. Also in each case there was the probability of infection from soil or horse dung. In 2 the incubation period was ten days, in 1 six days, and in the other indefinite, since the infection probably took place through a chronic ulcer which the man had allowed to become foul.

The first case I saw was interesting for this reason, that the patient, a lad of 16, came under my care for his injury on the day of his accident. He had a badly-lacerated wound of his thumb, with fracture of the metacarpal bone, caused by a gun accident. It was extremely dirty-looking.