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A Post-Graduate Lecture

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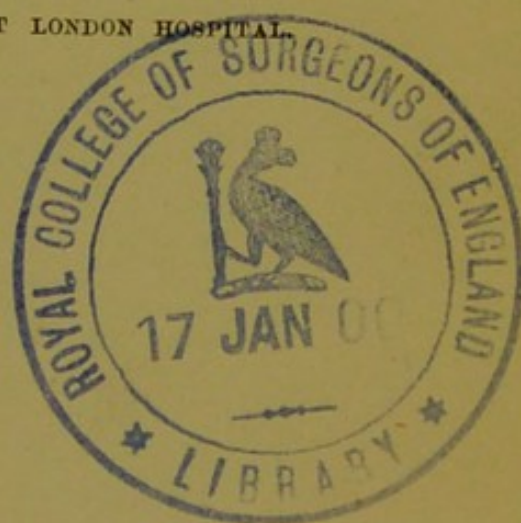
WOUNDS OF THE CILIARY REGION
AND THEIR TREATMENT

*Delivered at the West London Post-Graduate College on
July 10th, 1899*

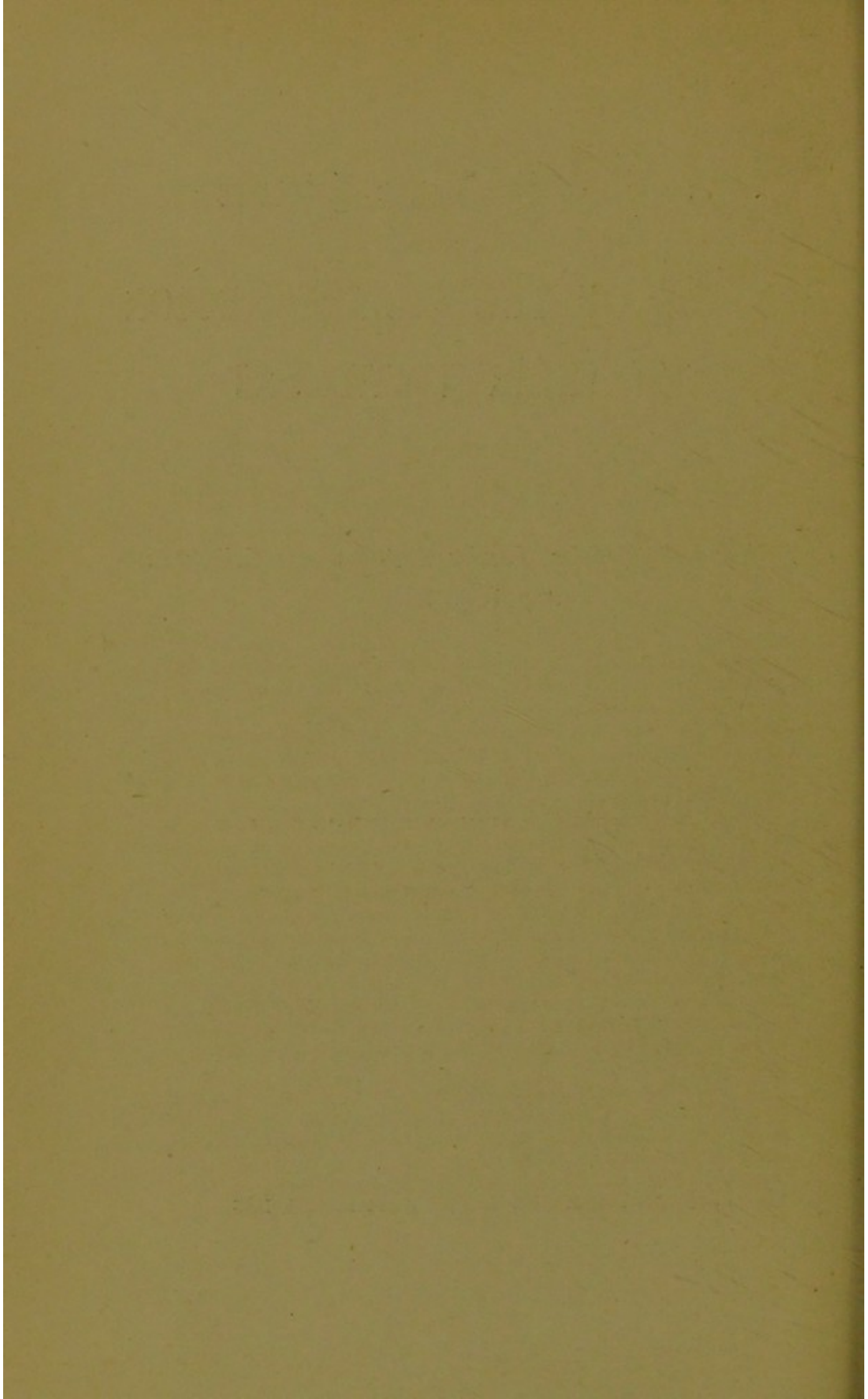
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A Post-Graduate Lecture

ON

WOUNDS OF THE CILIARY REGION AND THEIR TREATMENT.

GENTLEMEN,—It so happens that within the past few months I have had under treatment in the West London Hospital a succession of cases of wounds of the ciliary region, and this fact having naturally impressed itself upon my mind I thought that I could not better employ your time this afternoon than by making some observations upon this interesting subject.

Of all the traumatic lesions which befall the eye it is beyond dispute that the treatment of those which involve the ciliary region affords the most interest, speculation, and satisfaction to the modern ophthalmic surgeon. The reason of this is not far to seek. Such lesions in former times were always associated with a notorious record for evil-doing. It was not that the wounds themselves presented any special difficulty in treatment or that they were always destructive to the injured eyes, but it was the disastrous effects to which they were wont to give rise in the healthy or fellow eye which endowed them with such an unenviable notoriety.

In the days of our forefathers, of course, nothing was understood of the etiology of sympathetic ophthalmia. According to Brondeau the first reference which occurs to cases of the kind is to be found in a note recorded by a practitioner in the latter part of the seventeenth century. The note is as follows : "Yesterday I saw the daughter of a

certain official in Cimbria whose right eye had been blinded by a wound from a knife. The eye itself got well, but without sight, and the left eye, which was formally a healthy one, became the seat of incipient cataract." Not much is left to the imagination in this brief, though graphic, record, and it forms the beginning of a long series of disastrous records showing how one eye by means of sympathetic ophthalmia can fatally destroy the vision in the other. The dawn, however, of our knowledge of the disease arose when Mackenzie published his observations upon the subject in 1844. His description of it is as follows: "The general nature of the sympathetic affection is inflammation, not of the iris alone, but involving the whole of the internal texture of the eyeball, especially the crystalline lens and vitreous and retina, coming on generally in five or six weeks after an injury of the opposite eye, and terminating most frequently in atrophy and total amaurosis of the eye secondarily affected." Mackenzie's observations were based upon his experience of the disease as it was met with among his patients in the Glasgow Royal Infirmary, and it is remarkable how accurate his conclusions drawn from that experience have subsequently proved.

In passing I may remark that the maintenance of the integrity of the ciliary region is a matter of supreme importance to an eye; indeed, the vitality of the organ depends upon it. This is not difficult to understand when we recollect that the soul, so to speak, of an eye, as represented by its vascular and nerve distribution, resides in the ciliary processes. In this connexion you will remember how atrophy of an eyeball—or, as it is fancifully called in the text-books, "*phthisis bulbi*,"—may follow injuries or chronic inflammation of the ciliary region. An eye may make a good recovery from a severe wound of the ciliary region for a time, but it may happen that in the course of the secondary changes associated with the cicatrization of the wound the circulation of the blood through the ciliary processes may be so interfered with as to disturb the normal nutrition of the organ as the result of which atrophy of the globe follows. It is as well to remember these facts inasmuch as they have an important bearing upon the subject to which I am now inviting your attention.

I propose to classify wounds of the ciliary region into three varieties: (1) simple penetrating wounds; (2) those associated with prolapse of the iris and wound of the cornea; and (3) those associated with prolapse of the iris, wound of

the cornea, and traumatic cataract. The first variety is the least common, inasmuch as it usually occurs that the ciliary region being limited in extent the wound involves one or other of the adjacent structures. Only within the last few days, however, a woman came to my out-patient room with a punctured wound of the ciliary region caused by the stab of a darning needle. The accident had happened five days previously and when I came to examine the eye I found the globe to be very painful and deeply injected, the vision being *nil*. These signs pointed to the extreme probability of commencing panophthalmitis. I strongly urged the woman to come into the hospital and she agreed to do so on the next day, but she did not show herself again. The danger of punctured wounds of the eye, whether in the ciliary region or not, is mainly their liability to septic infection. When pathogenic micro-organisms, such as the staphylococcus albus or aureus, or the pneumococcus, are introduced into the vitreous—one of the best cultivation media that we know of—the result, panophthalmitis, is not to be wondered at. In the majority of cases, therefore, everything turns upon whether the foreign body causing the wound is or is not septic. If septic organisms are not carried into the eye the chances are all in favour of a good result ensuing; on the other hand, an eye is almost certainly doomed into which septic infection has been conveyed.

In the management of wounds of the ciliary region generally attention may be drawn to the following points. In the first place, it is essential that they should be seen by the surgeon as early as possible after their infliction, and, secondly, they should be rigidly treated with antiseptics from the beginning. The importance of seeing the wounds early is obvious, for the less time that elapses between the receipt of the injury and its antiseptic treatment the less opportunity is there for pathogenic infection to occur and the greater is the chance of preventing any harm ensuing therefrom. So far as the observance of antiseptic precautions is concerned in the treatment of all penetrating wounds of the eye the following rule has obtained now for some time in my practice at the West London Hospital. The first step is that of thoroughly cleansing the skin of the orbital region of the affected eye with a warm solution (1 in 2000) of chinosol; and here I may remark, in passing, that a good deal depends upon the antiseptic which is employed. By some surgeons it is believed that a solution of boric acid is all that

is necessary in these cases, but it may be pointed out that no general surgeon relies upon such an antiseptic when called upon to cleanse a wound, and if boric acid is not deemed to be a sufficiently trustworthy antiseptic in general surgery why should an exception be made in regard to the treatment of wounds of the eye? It may not be possible to sterilise completely the conjunctival sac, nevertheless I believe it to be quite an easy matter to keep wounds of the eye free from pathogenic infection by means of well-regulated antiseptic measures. The next step in the systematic antiseptic treatment is that of thoroughly douching the conjunctival sac of the injured organ with the chinosol solution, and this having been done the eye may then be carefully examined with the view of ascertaining the precise nature of the injury preparatory to the adoption of the special treatment which the case may happen to demand. In the subsequent treatment the eye should be douched twice daily with a 1 in 4000 solution of chinosol and eserine drops of the strength of half a grain to an ounce of water should be instilled. Under favourable circumstances—that is to say, in the absence of signs of septic infection—the injection of the globe will be found to subside gradually and in such cases a good result may be anticipated. On the other hand, if after the lapse of a fortnight or so there are no signs of improvement, the eye becomes painful and tender on palpation, the injection increases, and the vision vanishes, the probability is that enucleation will be required owing to the commencement of panophthalmitis.

In the case of wounds of the ciliary region associated with prolapse of the iris after every antiseptic care has been taken the eye should be placed under the influence of cocaine. A spring stop speculum should then be inserted between the lids and with a pair of sterilised forceps the projecting portion of the iris should be gently drawn out and snipped off with a pair of sterilised scissors close to the wound. The object of cutting off more of the iris than is prolapsed is in order to ensure that the resiliency of the structure will cause it to contract well within the anterior chamber—away, that is, as far as possible from the edges of the wound. The evil of a wound associated with prolapse of the iris is that as long as the latter remains outside the cornea it establishes a direct communication between the outside and the inside of the eye, thus exposing the organ to many dangers, septic and otherwise. It is essential, therefore, as soon as possible to excise the projecting portion of the iris in order that

any untoward complications likely to arise from its protrusion may be avoided.

I now come to wounds of the ciliary region complicated with traumatic cataract. These are the most unfavourable of all so far as the ultimate result to the eye is concerned. Especially is this the case in children. The eye in children appears to be much less able to recover from a wound of the ciliary region complicated with traumatic cataract than is the case in adults. Indeed, I may say that in my experience such injuries to the eye in children frequently terminate in enucleation. The treatment in such cases is mainly of the expectant description. The same antiseptic precautions having been observed as in the former instances, the eye should afterwards be kept under the influence of atropine. The object of this is partly to allow more room for the swelling of the cataractous lens and partly to facilitate the escape of the soft lens matter into the anterior chamber. The wound, however, having healed and the aqueous having been re-secreted the anterior chamber may become so full of lens matter as to bring about glaucomatous tension; consequently in these cases it is very essential to take careful note from time to time of the condition of the tension. In a case of traumatic cataract which was recently under my care which followed the puncture of the lens through a penetrating wound of the cornea caused by an iron nail the glaucomatous condition which ensued was such as to give rise to very acute suffering. I made, however, an upward section, performed an iridectomy, and let out a large quantity of soft lens matter, and by this means immediate relief was afforded. In the primary treatment, then, of cases of traumatic cataract, the condition of the tension of the injured organ is one of the main points to which attention should be carefully directed. If the case progresses favourably the lens matter will be gradually absorbed and the eye will recover. But the sight which may be retained will never be of much use as long as the other eye remains sound, inasmuch as the loss of the lens has the effect of destroying binocular vision.

In earlier days the first question which claimed consideration in cases of wound of the ciliary region was whether or not the injured eye should be immediately enucleated, and the reason for this was the then well-grounded fear of the ultimate development of sympathetic ophthalmia. Thus no doubt it often came to pass that in view of this possible

catastrophe many eyes were sacrificed which should have been saved ; and, on the other hand, many eyes were placed out of peril which would otherwise have been sympathetically destroyed. In the present day, however, the fear of sympathetic ophthalmia in these cases may be said to have passed away. Generally speaking, the integrity of the anterior part of the eye, and not the fact that the wound is in the ciliary region, now forms the guiding-line in determining whether or not enucleation should be performed. If the nature of the wound points to the possibility of the recovery of retention of useful vision—if, that is, the cornea be uninjured in the papillary area, the lens be intact, and the lesion be fairly limited in extent—the question of the situation of the injury need not call for consideration. On the other hand, the treatment of the case assumes quite a different aspect if the eye has clearly been irrevocably destroyed as an organ of vision. In these instances the necessity of primary enucleation admits of no dispute. No object would be gained by delaying the removal of the organ under these circumstances. But after all wounds of the ciliary region it is necessary to remember that the vision is generally very defective apart from the complications to which special allusion has been made. Frequently it is reduced to counting fingers within a few inches from the eye or even to a mere perception of light. The cause of this is the extravasation of blood which takes place into the vitreous, probably from injury to the ciliary processes. However, with the lapse of time, provided that the eye recovers, the blood will be gradually absorbed, and as the vitreous begins to clear large masses of blood-clot will be observed with the ophthalmoscope floating about in that medium. A well-marked instance of the recovery of vision in this regard occurred at the West London Hospital a few months ago. A barman, in whose hands a soda-water bottle had burst, causing a wound of the ciliary region and lower part of the right cornea with prolapse of the iris, was admitted under my care. The vision in the injured eye a few days after the accident barely amounted to counting fingers at six inches. Under the treatment, however, to which I have referred the eye made a perfect recovery and the patient can now read J. 1 and see $\frac{6}{6}$. In another case which was in the hospital about a month ago a soda-water bottle had burst in the hands of a boy, aged 16 years, inflicting a large jagged wound in the corneo-scleral junction, involving two-thirds of the ciliary region on the inner side.

The eye was quite collapsed when the patient was admitted into the hospital, so much so that there appeared to be but little chance of saving it. Despite, however, the severe injury the eye made an excellent recovery. The tension is now normal, and so perfect has been the union that it is only with difficulty that the line of the wound can be traced. Moreover the vision is rapidly improving. When last seen the patient was able to see $\frac{6}{60}$ and the blood was gradually disappearing from the vitreous.

A point to which attention may now be directed is that with reference to the use of sutures in the treatment of penetrating wounds or ruptures of the globe. Are sutures necessary? Personally I never resort to them, believing that directly loss of tension ensues as the result of the escape of the vitreous the tendency is for the edges of the divided sclerotic and conjunctiva to come together and to unite long before the tension can be restored sufficiently to imperil the integrity of the union. In no case have I ever inserted a suture and in no case have I ever regretted not doing so, and for the reason just given I deem any form of suture to be quite unnecessary.

In the course of this lecture I have referred to the tension twice—in the first place in connexion with atrophy of the globe, when it is much lowered, and secondly, in cases of traumatic cataract, when it is apt to be much increased. I may now add a few more words upon the same subject. If in the course of the treatment of wounds of the ciliary region—or for that matter any penetrating wound of the globe—the tension remains low, the eye may be regarded as doomed. Lowered tension, I believe, in these cases is generally due to liquefaction of the vitreous caused by commencing panophthalmitis. The vitreous is an ideal cultivation medium for pathogenic organisms, and just as the staphylococcus and other organisms of a like nature cause liquefaction of the medium upon which they are cultivated in the laboratory so it is reasonable to conclude that these organisms cause the vitreous to become fluid in the circumstances under which they gain entrance into the eye. I do not advance this suggestion as a fact, nevertheless there is a reasonableness about it which makes it both interesting and possible. It might be argued, however, that the lowered tension was due to the loss of vitreous occurring at the time of the receipt of the injury. This would be true for the first few days after the accident, but the explanation would not apply to the case

subsequently to that period or when the wound had united. The abhorrence, according to the old saying, that nature shows for a vacuum is wondrously illustrated in the case of ocular injuries. Take the simplest example—that in which the aqueous has been lost as the result of which the cornea becomes flaccid. In a few hours or less the aqueous is re-secreted, not too much but just sufficient to restore the anterior chamber to its normal dimensions. Then take the more serious example—that in which there has been much loss of vitreous, such as in the case of the boy to whom I have already referred where the globe became quite collapsed. Under these circumstances experience teaches that nature speedily sets to work to get rid of the vacuum. Fluid is secreted which takes the place of the vitreous and the process continues until the normal tension is reached and the contour of the globe is restored. Such restoration, however, of the globe is only possible in those cases in which the integrity of the ciliary region has not been seriously interfered with.

The next and last point to which I shall allude is that with reference to sympathetic ophthalmia, and at the outset I may remark that the observations which I shall make upon the subject are based upon the experience gained in those cases in which the disease might have occurred but did not do so. In the course of a lecture given in this place in 1898¹ I expressed the conviction that sympathetic ophthalmia would be an impossible complication of eye surgery were wounds of the organ generally, and those of the ciliary region in particular, to be treated from the first with every antiseptic precaution; and in this connexion it is significant to remember that before Listerism became part of the professional creed of surgeons sympathetic ophthalmia was of frequent occurrence, but on the other hand, ever since antiseptics have been employed in eye surgery the disease has become more and more infrequent, until nowadays it might with truth be described as an ocular pathological curiosity. That these are the undoubted facts lend strong support to the belief that the disease owes its origin to a pathogenic organism, more especially as we can point to the analogy of another disease upon the occurrence of which Listerism has had precisely the same restraining influence. No one, for example, can dispute that tetanus has been banished as a complication

¹ THE LANCET, Oct. 22nd, 1898, p. 1043.

of surgical wounds owing to the aseptic and antiseptic measures resorted to by operating surgeons. A ghastly tale is told of a surgeon in olden days who performed 10 consecutive amputations and each of the patients died from tetanus. The blame for these awful catastrophes was attributed by the surgeon to his saw, which had been used in a case of traumatic tetanus and which, of course, had not been properly cleansed afterwards. At present the question of whether or not sympathetic ophthalmia is a microbic disease is giving rise to a good deal of discussion. Some of those who hold that the disease cannot be of microbic origin point to the fact that no germ of sympathetic ophthalmia has been discovered, arguing that a germ which cannot be inoculated, cultivated, or stained by any known method in the present day cannot possibly have any existence. But such an argument must be obviously wrong, for it implies that bacteriology has already reached a stage of finality beyond which it is futile to expect that further progress can be made. The failure of bacteriology up to the present to isolate a specific organism of sympathetic ophthalmia cannot surely be taken as evidence that no such organism exists. Are we to assume that measles, scarlet fever, and certain other zymotic diseases are not microbic in origin merely because bacteriology has failed to show the specific germ upon which they depend? The reasonable conclusion at which to arrive in explanation of these cases is that the technique of bacteriology is at fault—that the laboratory has failed at present to elaborate methods of research by which the presence of certain micro-organisms can be demonstrated. In opposition, again, to the microbic origin of sympathetic ophthalmia the curious view has been advanced that the disease is not met with when the eye is most surrounded with organisms, such as in cases of panophthalmitis and gonorrhoeal ophthalmia. But to argue thus is to suppose that any organism was good enough to cause sympathetic ophthalmia, ignoring the fact that it would be just as wise to believe that the gonococcus was capable of producing tetanus, the tetanus bacillus capable of producing septicæmia, or the staphylococcus aureus capable of producing diphtheria. Deutschmann, when experimenting upon animals with a view to establish his migratory theory of the disease, injected pus organisms into their eyes for this purpose. In no case was he able to produce artificial sympathetic ophthalmia, but he succeeded very well in causing the animals to die from

general septic infection. Possibly, as my friend and colleague, Mr. Lenthal Cheate, suggests, sympathetic ophthalmia may be the product of many different micro-organisms, just like synovitis, pyæmia, and other diseases, and in any case, such a suggestion as this undeniably opens out a wide field for bacteriological inquiry, far transcending in its scope anything which has previously been attempted. Meanwhile, in the absence of more precise scientific data, I think that we cannot be far wrong in assuming that sympathetic ophthalmia is a microbic disease, that as such it is preventable, and that the secret of its prevention is the strict observance of aseptic and antiseptic principles in eye surgery. At all events this is a sound, practicable, and reasonable hypothesis upon which to act, no less in the interests of the injured organs than in those of the fellow or healthy eyes which might become sympathetically affected.

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