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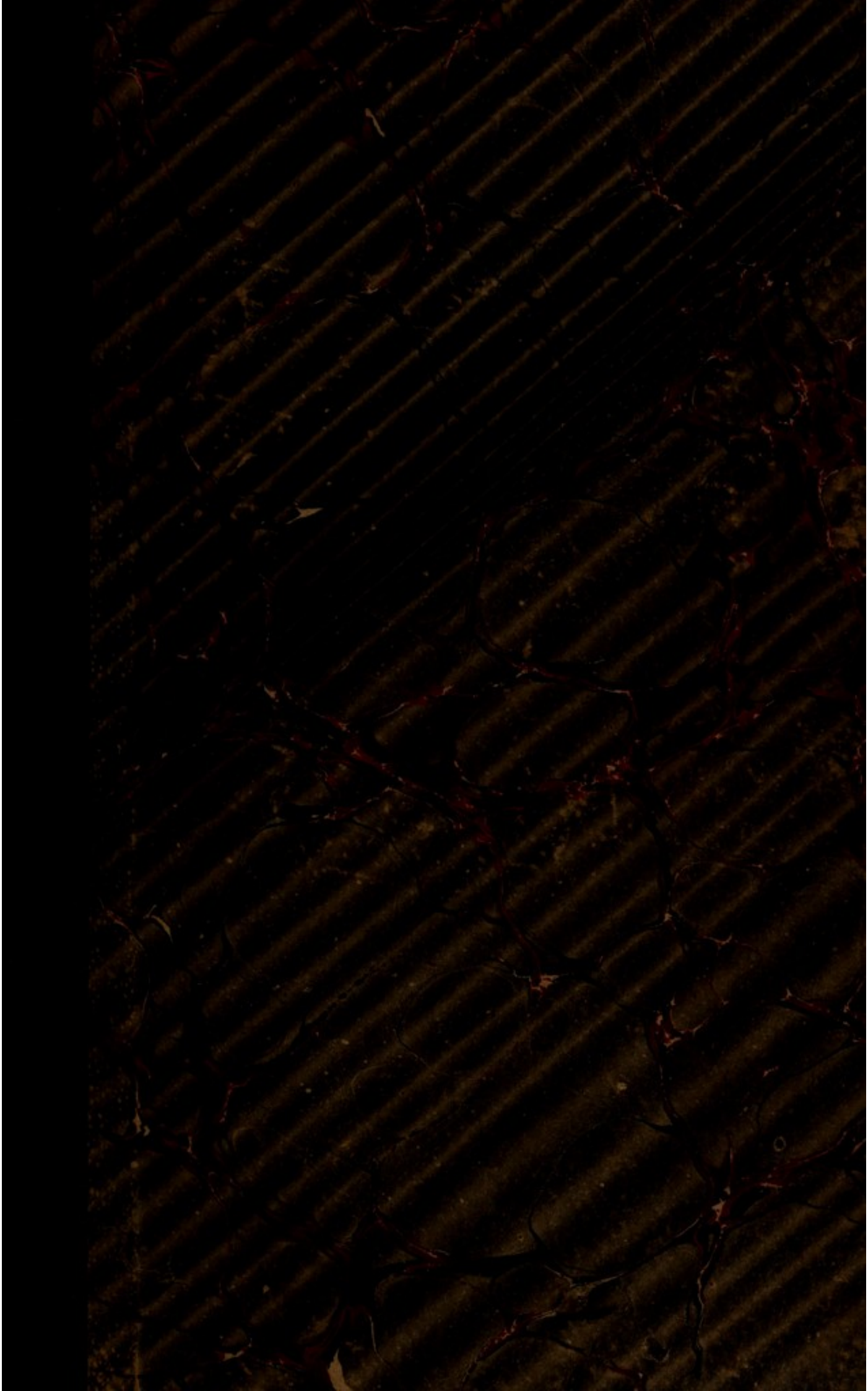

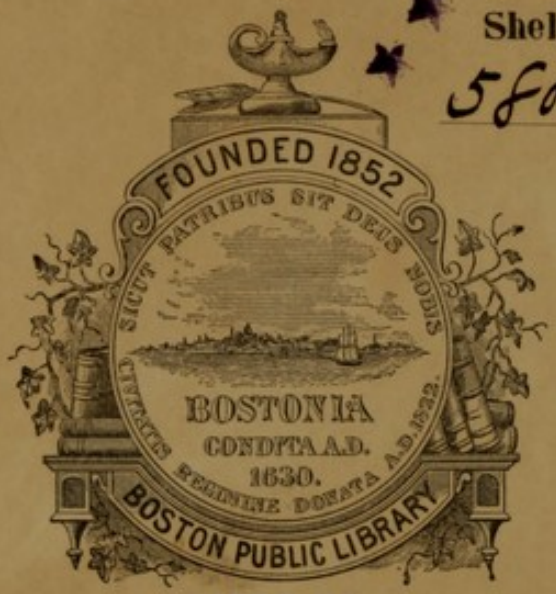

COCAINE

IN

OPHTHALMIC MEDICINE AND SURGERY.

BY

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COCAINE

IN

OPHTHALMIC MEDICINE AND SURGERY.

SIMPLE CATARACT EXTRACTION.

[illegible]

EXENTERATION OF THE EYEBALL.

THESE PAPERS HAVE LATELY APPEARED IN AN APPENDIX TO THE SECOND EDITION OF THE AUTHOR'S WORK ON THE DIAGNOSIS AND TREATMENT OF THE DISEASES OF THE EYE; WHICH EXPLAINS THE REFERENCE NOW AND THEN MADE IN THIS REPRINT TO CERTAIN PAGES OF THAT WORK.

Mrs. B. S. Shaw

June 8, 1893

APPENDIX.

COCAINE IN OPHTHALMIC MEDICINE AND SURGERY.

On the 15th of September, 1884, at the annual congress of the Heidelberger Ophthalmologische Gesellschaft, and on the 17th of October of that year, at the meeting of the Medical Society of Vienna, Dr. K. Koller, of Vienna, announced that, knowing the fact, observed by Schroff in 1862, that the application of cocaine, prepared from the leaves of Erythroxylon Coca, a Peruvian plant, caused insensibility of the tip of the tongue and of the throat, he had been led to inquire as to the effects of this substance on other mucous membranes, and to experiment with it upon the eyes of animals, and afterwards upon those of himself and his friends. The result of these researches had been the discovery that a drop or two of a 2 per cent. solution of the chlorhydrate of cocaine, applied inside the lids or upon the eyeball, caused complete and nearly instantaneous anæsthesia of the conjunctiva and the cornea; so that either of these could be touched or incised without exciting consciousness of pain in the animal or person experimented on. These assertions were made good by operations done in presence of the assembly. It is needless to say that the medical profession of the civilized world were soon actively engaged in testing for themselves the merits of the analgesic agent, for which so much was claimed; and they were not disappointed.

Dr. Koller's own account of this inestimable discovery, only second in importance to the demonstration of the

general anæsthetic powers of sulphuric ether, first made in this city in 1846, affords a brilliant example of wise conception, patient and careful investigation, and judicious estimation of the value of observed phenomena. I give a brief translation, as follows: —

"After a drop or two of the 2 per cent. cocaine solution had been introduced within the eyelids, the animal closed the lids for an instant, evidently feeling slight irritation. In from half a minute to a minute the lids were re-opened, and the eye had a fixed expression. If the cornea was then touched, without touching the eyelashes, the lids did not close, the globe remained unmoved, and the animal did not shrink. The strongest irritation of the cornea, by scratching or pricking with pins, or by cauterization of its surface, evidently caused no sensation whatever. Where previous inflammation of the cornea had been induced, the anæsthesia produced by the solution was as complete as in a healthy cornea. This lack of sensation continued, on the average, ten minutes.

"In experimenting on myself and friends, the following phenomena have been observed. After instillation of the solution upon the cornea, or in the conjunctival fold, there was a sensation of warmth, accompanied by a copious secretion of tears, succeeded in half a minute by a feeling of dryness. The lids were more than usually open, giving a slightly staring expression to the eye. There was an absolute absence of sensation or of reflex action when the cornea was touched; the same was the case with the conjunctiva, which, moreover, could no longer note differences of temperature. This complete insensitiveness continued from seven to ten minutes; with a gradual return after this time to the normal condition. Fifteen or twenty minutes after the instillation, the pupil began to dilate, the greatest size being reached within an hour, and the enlargement entirely disappearing a few hours later. This dilatation was never *ad maximum;* and the pupil con-

tinued to react to the influence of light and to efforts of convergence of the eyes; so that there was at no time the dimness of vision for small objects which attends mydriasis resulting from the use of atropia; but merely a paresis of the accommodation. I furthermore observed a marked anæmia of the conjunctiva, especially in its palpebral portion. In no case did the cocaine give rise to other symptoms of irritation. The wide opening of the lids, supervening at the same time with the anæsthesia of the cornea and conjunctiva, I attribute to the absence of that sensitiveness which, in the normal state, determines the closing of the lids to a certain point. If, after the disappearance of this first anæsthesia, the instillations of cocaine are repeated, a cumulative effect is to some extent gained, and the duration of complete insensibility may be doubled. There is no doubt of the penetration of the cocaine, by slow absorption, to the interior parts of the eye; as after instilling a 5 per cent. solution once in five minutes for half an hour, I found the sensitiveness of these parts to strong pressure greatly diminished."

"I have used a 2 per cent. solution upon a large number of patients affected with conjunctivitis, and with eruptions and ulcers of the cornea. Within a few minutes they have invariably experienced a notable amelioration of their subjective symptoms, the pains were relieved, and the photophobia had greatly lessened. This improvement continued for two or three hours. There is every reason to believe, though as yet I have not had opportunity to verify this, that a repeated application of the remedy at the proper intervals would permanently relieve, or, at least, greatly diminish, the symptoms. I have had the same success in painful erosion of the limbus corneæ. Even in the extreme pain accompanying inflammation of the iris, I think the efficacy of cocaine can be relied on; for the extension of its effect to the iris and the ciliary body appears to me to be demonstrated. Its contractile action

upon the blood-vessels may well have a favorable influence on morbid processes in the iris. Perhaps in combination with atropia it may have a great effect in this disease."

"If cocaine is applied previous to the use of stimulating or caustic remedies upon the inner surface of the eyelids, the severe pain otherwise caused is either unfelt or is rendered very slight; — although in some patients the pain declares itself at such time afterwards as the analgesic influence begins to subside; but this pain quickly ceases if renewed instillations of the cocaine are made."

As regards its efficiency as a local anæsthetic in ophthalmic surgery, the observations of Dr Koller, necessarily limited in number at the time of his announcement, are no less accurate and satisfactory. He says: "Cocaine finds a special adaptation in the extraction of foreign bodies from the surface or the substance of the cornea. After one or two applications of a 2 per cent. solution, the patient is no longer conscious of the presence of a foreign body; and while this is being removed he is able to hold the eyeball perfectly still; declaring that he feels nothing. Operations for the removal of staphyloma upon two children, and operations for cataract with iridectomy were done nearly painlessly after the use of a 5 per cent. solution of cocaine every five minutes for half an hour."

Thus had the problem been definitely solved by Dr. Koller; — and his results are amply confirmed by the researches of others. There is yet discussion among authorities as to some matters of detail; and still further observation is needed as to the extent of application and the safety of this new agent. Though this, like most other usually harmless therapeutic means, may possibly be harmful if ignorantly applied; the alleged critical symptoms which have been imputed to its use, in a few instances among many thousands of cases in which cocaine has been employed, may be explained by the still imperfect knowledge of the qualities of this tranquillizing means so recently

bestowed upon us: and, while they should teach us caution, they by no means forbid its free but prudent use. The local or general accidents which have been attributed to cocaine have been: superficial cloudiness or desquamation of the cornea; vertigo or other cerebral symptoms, occurring in aged or enfeebled persons; and panophthalmitis. In nearly if not all of the reported cases, solutions of 4 or 5 per cent. have been used. It is quite possible that the high price and scarcity of cocaine preparations soon after the first sudden and enormous demand for them, may have led to accidental or intentional adulterations having irritating qualities; or the lack of freshness of some solutions, or their needlessly repeated application, may have affected the cornea in a few instances.

Vertigo or other temporary cerebral disturbances were by no means unknown in timid, aged, or feeble persons, during the performance of cataract extraction, with or without etherization; before the advent of cocaine. Acting as this apparently does only on the terminal nervous fibres, it seems unlikely that it should give rise to ophthalmitis; the origin of which it would be perhaps more rational to refer either to an epidemic ophthalmitis after operation, such as had frequently been observed before the introduction of cocaine; or, possibly, in one hospital where a number of cases occurred whilst other institutions in the same city were exempt, to the use of hygroscopic gelatine discs containing cocaine, — which might have been a nidus of germs; or, in the case of another practitioner, to staleness of the solution employed, — this gentleman experiencing no further mishaps after he substituted fresh solutions, although he used those of 8 per cent. I have many times made use of 4 per cent. or sometimes stronger solutions of cocaine; yet, neither in my own practice nor within my personal knowledge, have I ever known harm to result from so doing; although, as a rule, I now prefer a 2 per cent. solution, as being sufficiently effective. We know, how-

ever, that solutions of 20 or 25 or more per cent. are made use of by laryngologists and dentists; and subcutaneously, sometimes in considerable quantity, by surgeons; and we may feel reasonably safe in applying a very weak solution to the eye; knowing as we do how very many times this has been done without detriment. It is a boon for ophthalmic surgery that general anæsthesia may now be nearly always dispensed with for those operations which require the most delicacy of manipulation; — except, of course, in children or very nervous persons, who would be intractable even if they felt no pain. Warlomont says: "With rare exceptions, general anæsthesia is destined to be disused for operations on the globe of the eye; — and scarcely any operation should be done without cocaine." Klein, of Vienna, in his work published in 1886, says: "Narcosis is now become unnecessary in cataract operations; as with cocaine they are done almost painlessly." It is indeed a great thing that a patient can now submit himself to an operation without trembling with fear.

The absolute tranquillity of the eye, and of the patient, obtained by the use of cocaine, adds greatly to the safety of operations for extraction of cataract; as there is no reflex muscular contraction, and no subsequent nausea and vomiting, to extrude the iris or expel a portion of the vitreous; and none of the involuntary movements of the globe and the lids during the period of recovery from unconsciousness, to cause loss of vitreous, hernia iridis, or displacement of the edges of the corneal wound.

It seems to be now generally conceded that for simple cataract extraction, where iridectomy is not done, one or two or three instillations upon the cornea, at intervals of three minutes, of a 2 per cent. solution of chlorhydrate of cocaine, are enough to induce sufficient anæsthesia. The eye and lids have become unconscious of the use of the elevator for the lids, of the corneal incision, and of the exit of the lens. After the operation, before applying the

dressings, it is well to instil another drop or two of the solution; so as to keep up for a while the anæsthetic influence, and thus lessen the disposition to move the eye or the lids.

For the painless performance of iridectomy, or for the extraction of foreign bodies from the interior of the eye, by the magnet or otherwise, repeated applications of the solution of cocaine should be made for some time before operating, or a little should be instilled into the eye after the section of the cornea has been made. In the removal of pterygium or other external growths, it may be requisite to repeat the cocaine as the operation is proceeded with.

For strabismus operations, instillations should not only be made on the conjunctiva previous to its incision, but the solution should be injected beneath the conjunctiva, over the situation of the tendon, before cutting the latter. A similar course is advisable in the removal of chalazion or other growths from the eyelids. Cysts of any size of the lid or orbit may call for subcutaneous injection. Staphylomata may be painlessly excised, with or without evisceration of the contents of the globe, and sutures inserted to unite the edges of the wound, after several instillations of cocaine. Neurotomy or enucleation may be advanced through the first stages of the operation by applications of the cocaine while the conjunctiva and tendons are divided; but, to prevent pain upon section of the optic and ciliary nerves, orbital injections of the solution would be needed; and as regards the absolute safety of these there appears to be some question. The subsequent suture of the divided conjunctiva can be made painlessly. Paracentesis of the cornea, for the evacuation of hypopion or for other reasons, as well as excision of a prolapsus of the iris through a corneal perforation, call for the aid of cocaine, to secure immobility and abolish reflex action.

Although the advantages obtained by the use of cocaine in eye operations are so many and so marked, it has a yet

broader field for its usefulness in the vastly larger number of persons who daily and hourly derive benefit from its use as a remedial agent in the numerous inflammatory affections of the eye. In eyes which are suffering from extreme photophobia, or are irritated by the presence of a foreign body, or have received a severe traumatic injury, it facilitates the necessary inspection of their condition. It may also be used, in a few cases, for opthalmoscopic inspection, to effect a sufficient but transient dilatation of the pupil, without causing the continued annoyance following the use of atropia for this purpose.

In the *Annales d' Oculistique*, Avril, 1885, the Editor-in-chief, M. Warlomont, writes as follows: "Till now, endeavors seem to have been made only to abolish pain and the reflex acts which depend upon it, by cocaine; such, for instance, as the photophobia in cases of ulceration of the cornea. In our judgment, its ischæmic properties have been too much ignored. After the transient sensation of slight smarting, caused by the immediate action of the cocaine, the eye feels a sensation of coolness, and the conjunctiva becomes paler than previously. This double action of the remedy might apparently be utilized in treatment of the congestive affections of the ocular membranes, the conjunctiva, iris, sclera, etc.

"The slightly mydriatic effects of the cocaine may be neutralized by combining eserine with it, in the proportion of one part eserine to twenty-five of cocaine. Morphia may be employed to increase or prolong its anæsthetic influence."

In the number for January, 1886, referring to the above statement of opinion, he adds: "To-day we have no longer any doubt on this subject. For months we have used on a large scale, with the greatest success, collyria containing equal parts of cocaine and morphine (five centigrammes of each); sometimes combining them, according to the cases, with eserine or atropine, in all affections of the eye accompa-

nied by pain and hyperæmia; keratitis, scleritis, iritis, corneal ulcer, injuries from foreign bodies, accidents consecutive to operations, etc., etc.; and, very important to mention, without having ever met with a single case where the cocaine has given rise to general symptoms, although we rarely inspect a sensitive eye without previously applying it. This, it must be admitted, is reassuring."

The keeping an injured or inflamed eye as free as possible from movement is sometimes essential to its recovery. This is accomplished by the aid of cocaine, in allaying the irritation which excites spasmodic friction of the lids upon the affected surfaces. In abrasions of the cornea, often the source of agonizing pain, the symptoms are at once relieved by its use; and rapid healing of the excoriation is promoted by now and then instilling a drop of the solution. A foreign body implanted in the cornea or hidden beneath the lid can be removed with surprising facility from the utterly unconscious eye after a single instillation. Where gunpowder has been blown into the eye in large amount, its immediate removal is important; but this was formerly almost impossible without etherization. Recently, I saw a case where the entire epithelial layer of the cornea in one eye, and a large part of it in the other, was completely riddled by implanted grains of powder from a premature blast. Vision was abolished. This disorganized, totally black surface was painlessly removed by patient work, cocaine being instilled from time to time without a resort to general anæsthesia. Good sight was recovered.

Eserine or pilocarpine may be combined with the cocaine with much benefit in many cases of corneal ulceration, with photophobia; and such collyria are advantageous substitutes for the solutions of atropia so long indiscriminately used in these and other eye affections. The complete reparation of a deep corneal ulcer is not to be always immediately accomplished; but the urgent symptoms of pain and intolerance of light are usually at once mitigated, and the heal-

ing process is hastened by these calmative applications, used more or less frequently, as required.

Phlyctenular papulæ, whether situated on the conjunctiva, or in a flattened herpetic form on the cornea, create much irritation, though rarely inducing serious results. Here, also, immediate mitigation and speedier cure can be attained by instillations of cocaine; and although, where the raised and vascular spot is situated in the corneal epithelium, complete recovery may be delayed, no such anxiety need be felt as is caused by the existence of ulceration. Klein regards cocaine useful, in these cases, not only in quieting pain and photophobia, but as exercising a contractile influence on the blood-vessels which have become developed on the cornea.

In the various forms of conjunctivitis, catarrhal, phlyctenular, trachomatous, etc., cocaine lessens the vascularity, diminishes the morbid secretions, and relieves the photophobia and blepharospasm; thus mitigating the discomfort of the patient, reducing the risk of implication of the cornea, and shortening the disease. Of course, its use in all these inflammatory conditions is to be associated with suitable astringent or other remedies, in the form of collyria, used at home by the patient, or of various auxiliary means applied by the physician himself. Where, as in the chronic forms of granular and trachomatous conjunctivitis, frequently repeated applications to the roughened lids of a crayon of copper sulphate or some other active astringent is requisite, cocaine not only assuages the pain following their use, but, by its quieting effect, lessens the flushing of the surfaces and the copious lachrymation; which symptoms may persist for a considerable time where this is not used. The relief to the feelings of the surgeon, in knowing that he is no longer, as formerly, causing much pain in making these indispensable applications, is scarcely less than that of the patient. A drop or more of the 2 per cent. solution may be spirted upon the lids or the globe from a

drop-tube; then, after waiting a minute or so, the upper lid may be everted much more readily after the use of the sedative solution, and the crayon applied to its surface more or less lightly or extensively, according to the indications from day to day in each case, and not in too routine a manner. It is well to make a second application of the cocaine after the touch with the crayon. In some instances, at the end of the period of usual duration of the anæsthetic action of the cocaine, or afterward, pain begins to be felt; but this is generally only moderate in degree. If needed, however, the patient or his friends should renew the instillations of cocaine from a dropper or a teaspoon, continuing these till relief is gained. So far as one can judge, in affections of so chronic a character and variable duration, I am satisfied that recoveries are more rapid than when no such mitigating appliances were at our command. In treatment of obstructions of the lachrymal passages, the pain caused by the passage of probes is obviously reduced by the previous injection of a few drops of cocaine solution through the punctum into the lachrymal sac.

My experience in the application of cocaine to the treatment of iritis has been considerable and satisfactory. The intense pain accompanying attacks of this disease, aggravated at night, and often extending to the supra-orbital and temporal regions, is most disquieting to the sufferer, and frequently requires large and sometimes repeated doses of opiates to control the severity of its paroxysms. I have found instillations upon the eye of a 2 per cent. solution of cocaine, once in five minutes, generally sufficient for relief in from fifteen to thirty minutes. In a few cases, a 4 per cent. solution has been used, in order to obtain prompter action. As a rule, the suffering has been alleviated, and the patient could enjoy good sleep during the night; but sometimes a renewed access of pain required a repetition of the lethal applications. If, in some instances, the relief at once obtained, or gained by a second

resort to the instillations, is not sufficiently prompt or complete, opium or morphia may be employed as an adjuvant. Some of the cases I refer to have been persons of rheumatic diathesis, subject to frequently recurring attacks, of which I had often watched the course; and the judgment of these individuals, accustomed to note all the varying phases in the attacks of their disease, has coincided with my own observation as to the great relief obtained by the new plan of treatment, and the marked abbreviation of the attacks. Atropia should be applied, *pro re nata*, to maintain large dilatation of the pupil; its efficiency being seemingly increased, as is also that of opium or morphia, by the combination with cocaine. Where sufficient solace can be obtained by the aid of cocaine alone without other narcotics, the patient escapes the disagreeable sequelæ ensuing upon the administration of large opiates, which become so troublesome where their help is needed for several nights in succession. If even partial relief is obtained by its means, the patient is in so far a gainer in the lessening of the amount of anodynes which would otherwise be required.

Numerous other conditions will suggest themselves in which cocaine may fulfil its peaceful mission. One instance, in particular, seems most promising: its use as a local application for the relief of the agonizing pains occurring in herpes zoster frontalis; but, as this affection is rare, I have not, as yet, seen an instance of it since the addition of cocaine to our resources.

SIMPLE CATARACT EXTRACTION.

An important matter, in respect to which a strong revulsion of opinion has taken place within a short time, is the question as to the most advantageous procedure in operating for senile cataract.

From the time when Von Gräfe, in 1865, promulgated the linear peripheral scleral section, combined always with iridectomy, as being the most desirable method for extraction of cataract, this plan continued to be accepted and followed, on his authority, until very recently almost unquestioned by the great majority of operators. Some, however, including names of the highest distinction, — Sichel, Bowman, Hasner, Desmarres, and others, — never adopted Von Gräfe's idea; and, gradually, nearly all the most noted and experienced among his adherents adopted each his own modification of the method inculcated by him, either altering the form or the extent of the incision, placing the section more or less in the cornea instead of wholly within the sclera, varying the amount of excision of the iris, etc., etc.

Already, in 1879, Warlomont, in his *Annales d'Oculistique*, had predicted a return to the French method of extraction, as introduced by Daviel. "There will soon be nothing remaining of the revolutionary linear method except the special form of the knife used in it; no more linear incisions; no more iridectomies." My own opinion was expressed in this work in 1882, p. 278. In November, 1882, Chavernac read a paper before the *Société de Chirurgie de Paris*, entitled *Retour à la méthode de Daviel pour l'extraction de la Cataracte*, in which he gives an account of his experience, first, of four years with Daviel's process, then of eight years with Von Gräfe's peripheral linear section with iridectomy, and, lastly, of another four years of practice, with much greater success, in resuming Daviel's plan. In February, 1883, Galezowski published, in the

Recueil d'Ophthalmologie, a paper on *Extraction de la Cataracte sans excision de l'iris*, in which he gives his conclusions, based on an experience of 1022 cases: "1. Excision of the iris by no means prevents phlegmonous accidents; 2. It is often the cause of secondary cataract; 3. Scleral or sclero-corneal wounds are more perilous to the result of the operation than are wounds of the cornea." He therefore returns to the method of Daviel, modifying this by making the flap extend only from 3 millimetres above the horizontal diameter of the cornea to 2 millimetres from the superior scleral border. He records seventy-four operations thus performed without serious accident, and with a visual acuteness $\frac{1}{3}$–$\frac{1}{4}$ greater than in eyes where iridectomy had been done. Two years later, at the Congress of the *Société Française d'Ophthalmologie*, he reiterates the same opinions, and says further that prolapsus of the iris or loss of vitreous during the operation was very rare; and that astigmatism after recovery, if existing at all, was so slight as to be practically *nil*, instead of being frequent and considerable as when Von Gräfe's operation was done. Panas, at the same meeting, and afterward, declared himself a strong partisan of extraction without iridectomy. In the *Annales d'Oculistique*, December, 1884, and August and December, 1885, De Wecker describes at length the advantages of his "Simple Extraction," done without iridectomy; the section including the upper third of the cornea, and conforming exactly to the limit of its transparent border. He refers to the frequency of sympathetic ophthalmia after Gräfe's peripheral scleral section, as a consequence of implication of the ciliary body in the cicatrix of the wound; as well as of destructive irido-choroiditis of the operated eye; — results wholly unknown previous to the introduction of Von Gräfe's method. He regards excision of even a small portion of the iris as objectionable, since it involves danger of iridal or capsular adhesions to the inner face of the corneal wound, which is unlikely to

occur where the sphinctar iridis has been left intact. He considers a combination of eserine with cocaine as a security against prolapsus of the iris or capsular entanglement, and lays great stress upon antiseptic precautions against infection of the wound.

Sir William Bowman, in a letter to De Wecker, July, 1885, writes: "I do not remember that I ever made a great point of the section for extraction of cataract being *exactly* one-third of the corneal margin, neither more nor less; but certainly that was what it amounted to in a large number of cases. The extent of the incision *varied* according to one's conception of what the size and bulk, hardness or softness of the lens was likely to prove in the particular case, the *principle* being to make the incision *quite large enough*, but not *needlessly large*, to admit of the lens emerging without undue dragging, or the risk of having fragments of its margin broken off in its passage. I speak of extraction without iridectomy and without scoop. I myself generally preferred to have the incision run in near the corneal margin, but I was in the habit for many years of trying various methods, from extreme marginal to more or less far intra-corneal ones."

The importance of the questions involved justifies the details I have given of the recent change of opinion which has so suddenly, and as if by general consent, taken place with regard to cataract extraction. It was my privilege, a short time previous to the promulgation of Von Gräfe's method, to witness, and to amply appreciate, the operative dexterity of its illustrious author; but after a fair trial of his plan, it did not commend itself to my judgment. But as *una voce poco fa*, I have here cited the opinions of some, from among many unquestioned authorities, in favor of a mode of operation comprised in a section of the cornea of moderate extent, not conforming too rigorously to exact limits, but varied, as advised by Bowman, to suit the requirements of each case; — and done without mutilation

of the iris. It will be seen that there is substantial agreement among the authorities cited, as to the situation and the form of the corneal flap. The method of Lebrun, described in this work, pp. 278–281, differs slightly from this in being rather more intra-corneal. The only criticism I have seen of it, however, is that there is a tendency to prolapsus of the iris or to the formation of adhesions between the pupillary margin of the iris and the scar of the corneal section. But adhesions of the outer marginal portions of the iris to the scar of Gräfe's peripheral linear section, are by no means rare. These marginal synechiæ, so near to the iridal angle and the ciliary region, are liable to induce subsequent dangerous symptoms, involving one or sometimes both eyes; as proven by the numbers of cases of sympathetic ophthalmia cited by De Wecker, Nettleship, and other authorities. On the contrary, where there is anterior synechia of the pupillary margin of the iris, this is usually but slight, affects vision little if at all, and gives rise to no irritation of the eye. De Wecker says, on this point, *Annales d' Oculistique*, August, 1885: "There is no comparison to be made between an inclusion of a peripheral portion of the iris in a section near its border, and an inclusion or adhesion to the scar of a section in the cornea proper and situated near the sphincter at the pupillary margin. Whilst in the first case we see extreme sensitiveness of the eye and especially of the ciliary region, followed by iritis or irido-choroiditis which often results unfavorably; we observe, in cases of synechia of parts of the iris near the margin of the pupil in a corneal wound, only an absolutely tolerant state of the eye."

As an offset to the possible formation of anterior synechia, the median flap of Lebrun offers this advantage over a less intra-corneal section; of being so placed as to allow of easy exit of the lens, with little friction upon the iris during its escape, and with therefore less chance of separation of cortical portions from the mass of the lens,

or of a loss of vitreous. But it is not to be forgotten that with the present means at our command in employing eserine and cocaine, the chance of the occurrence of prolapsus, or the formation of synechiæ, is reduced to a minimum; the sedative, cocaine, preventing reflex spasm of the ocular muscles, and the myotic, eserine, or pilocarpine, causing subsequent contraction of the pupil, and drawing the iris away from contact with the corneal wound.

At a meeting of the Ophthalmological Society of Great Britain and Ireland, 15 October, 1885, Dr. McKeown of Belfast, read an account of a novel *modus operandi* deserving of mention; which consisted in the very gentle injection of a few drops of distilled water, at about the temperature of the body, by means of a small syringe, within the capsule of the crystalline, after the expulsion of the lens; to remove any transparent or opaque portions of cortical substance which may remain within the capsule, instead of removing these by massage of the cornea. Thirty-nine cases were reported with good results. Other experimentors seem to favor the procedure. As yet I have not found opportunity to make trial of this plan; but the removal of these sometimes tenacious, sticky masses, without prolonged friction manipulations upon the eyeball is a great desideratum, since they are a not infrequent cause of accident during efforts for their expulsion, or may give rise to troublesome symptoms if left *in situ*.

EXENTERATION OF THE EYEBALL.

At the International Ophthalmological Congress, held at London, in 1872, a vote was proposed for adoption recommending the immediate enucleation of every eye which had been evidently hopelessly injured by an accident; as a safeguard against sympathetic ophthalmia. This was not accepted by the congress; but the discussion served to show that a certain number of its members favored the proposition, as they did also the ablation of eyeballs which had become disorganized by irido-choroiditis, separation of the retina, etc., provided morbid sensitiveness or injection of the ciliary region continued or occurred. As a result of this prevailing sentiment, diseased eyeballs were freely sacrificed during the ensuing ten years; many of them by practitioners who dared not risk the responsibilities possibly involved in delay and an expectant treatment. In 1876, Boucheron proposed division of the optic and ciliary nerves behind the eyeball as a substitute in many instances for removal of the globe. This procedure proved advantageous in numerous cases; and many reasonably sightly, although sightless eyeballs were thus preserved, to the great advantage of their wearers. On my last European visit, two years since, I soon perceived a change of practice in regard to the frequency of a resort to enucleation, which accorded with my own judgment, always rather conservative in this matter. Two of the most distinguished operators whose cliniques I visited, before knowing my own views, spoke of the comparative rarity with which they nowadays resorted to enucleation; one of the gentlemen saying that he did not now remove one eye where he formerly would have removed six.

In my first published work on Diseases of the Eye, in 1862, I recommended laying open the globe, in cases of purulent ophthalmitis, and evacuation of its more solid contents, so as to permit its collapse, in hydrophthalmia and large staphyloma, as already advocated as a means of pre-

venting sympathetic ophthalmia by Mackenzie, in 1854, Diseases of the Eye, p. 621. This practice of exenteration I have ever since followed, as described in the present volume, pp. 71, 121, 179, 273, 295, 405; removing the ocular contents by means of a scoop, or a lid-elevator, or a sponge, when these contents had become sloughy, and retaining a portion of these where it was only necessary to remedy abnormal enlargement, but where no great disorganization had taken place in the internal transparent media. With or without evisceration, the edges of the retained portion of the tunics of the eyeball were brought together by sutures. In cases where there was already inflammatory action, this gradually subsided; in other instances, almost immediate healing took place, and, even where the globe had been entirely evacuated, the scleral cavity seemed sometimes to refill, so that no very marked contraction took place, and artificial eyes were worn with more comfort and advantage than after enucleation. In no instance have any serious results followed; and the patients, whilst perfectly secured against sympathetic disease, have been spared the more serious mutilation, as well as the dangers, attending enucleation.

In September, 1884, in a paper presented at the meeting of German Naturalists at Magdebourg, Prof. Alfred Gräfe, after referring to the great number of fatalities from meningitis occurring as a consequence of enucleation of the globe, advised exenteration of the eye as a substitute in all cases for the more serious operation; as offering an equally certain guaranty against sympathetic ophthalmia; whilst being a less important cosmetic loss to the patient, and creating a wound of less extent, separated by the interposed sclera from communication with the orbit and the cranial cavity; thus averting the dangers of fatal consequences which attend enucleation. These suggestions, in favor of the general adoption of a far milder substitute instead of a really grave operation, have met with general acceptance by the profession.