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EPIPHORA, OR WATERY EYE:

ITS

SUCCESSFUL TREATMENT

BY

THE NEW METHOD OF DILATATION.

With Illustrative Cases.

BY

JAMES VOSE SOLOMON,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS, LONDON;
SURGEON TO THE BIRMINGHAM AND MIDLAND COUNTIES EYE INFIRMARY;
SURGEON TO THE LICENSED VICTUALLERS' ASYLUM;
FORMERLY SURGEON TO THE BIRMINGHAM GENERAL DISPENSARY.

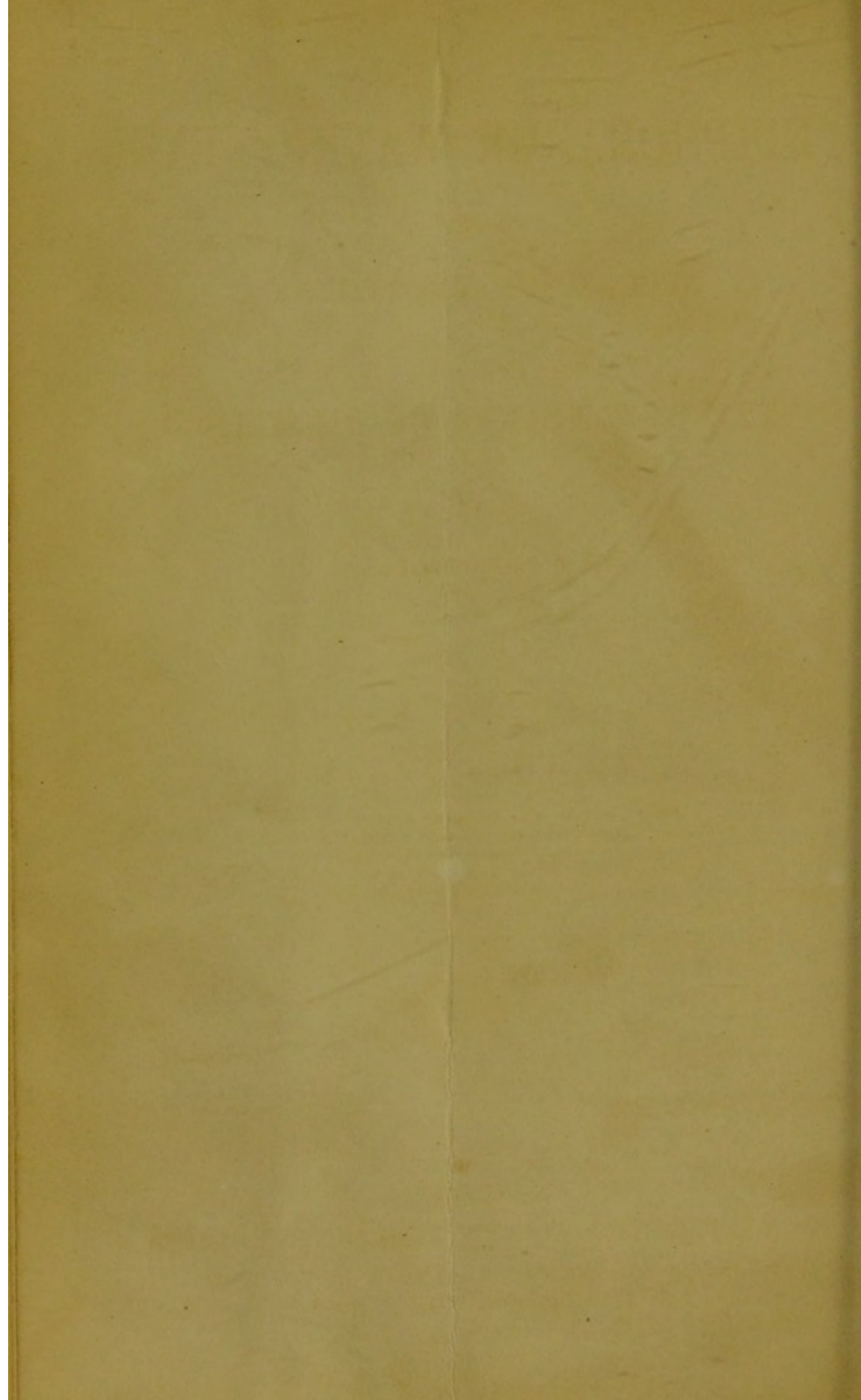
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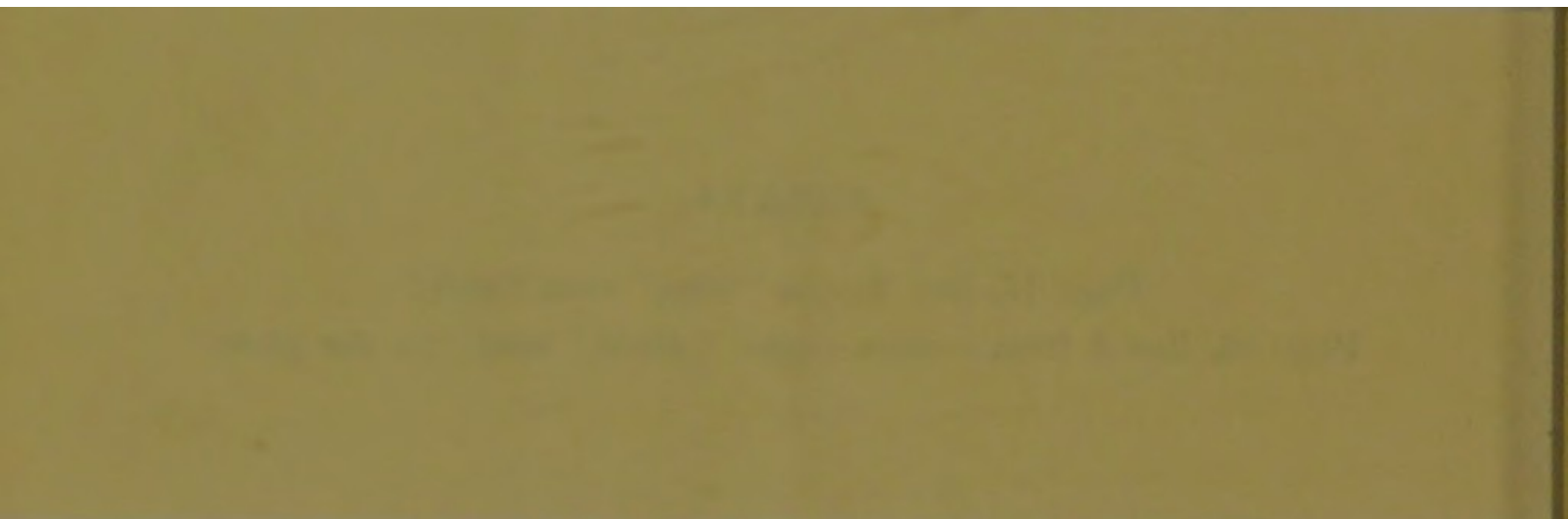
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ERRATA.

Page 17, line 2—*for* “also,” *read* “and.”

Page 32, line 2 from bottom—*after* “canal,” *read* “to the globe.”



INTRODUCTION.

THE substance of the remarks contained in the following pages appeared in the *British Medical Journal*, to which periodical the author first communicated the results of his experience in the treatment of Epiphora by the new method of dilatation through a slit punctum. The facts then published excited considerable interest, and gave rise to many inquiries for further information on the management of a disease which appears to be still considered by the majority of surgeons as incurable unless a silver style be inserted into the nasal duct. The author has, therefore, been induced to publish the paper in a more extended form, in the hope that it may prove useful to the profession. Portions of the original matter have been rewritten, some important facts introduced, and new cases added.

With a view to insure accuracy of illustration, and to guard against the errors incident to an early experience of the special plan of treatment adopted—although the author has treated nearly seventy patients—no case which occurred during the first four months of his investigations has been related.

96, Newhall Street, Birmingham.

INTRODUCTION

The purpose of this study is to investigate the effects of the various factors which influence the rate of the reaction between hydrogen peroxide and potassium iodide. The reaction is of the following type:

$$2H_2O_2 + 2KI \rightarrow 2H_2O + 2KOH + I_2$$

The rate of the reaction is measured by the volume of iodine liberated in a given time. The rate is affected by the concentration of the reactants, the temperature, and the presence of a catalyst. The effect of each of these factors will be studied in the following experiments.

The first experiment is designed to determine the effect of the concentration of the potassium iodide on the rate of the reaction. The second experiment is designed to determine the effect of the concentration of the hydrogen peroxide on the rate of the reaction. The third experiment is designed to determine the effect of the temperature on the rate of the reaction. The fourth experiment is designed to determine the effect of the presence of a catalyst on the rate of the reaction.

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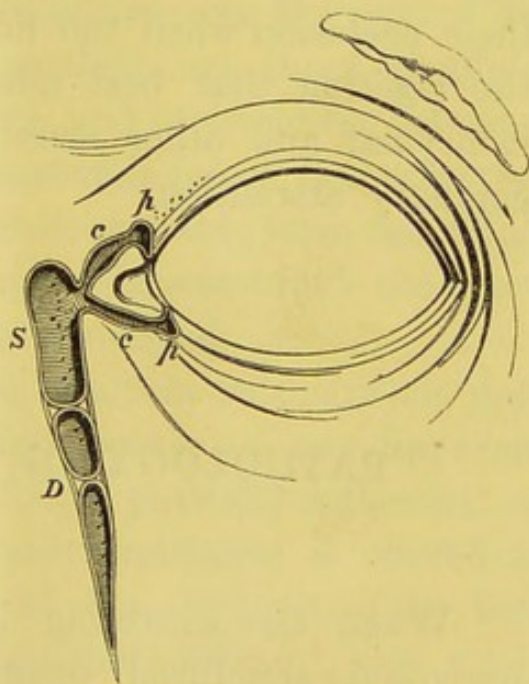
The New Treatment

OF

EPIPHORA, OR WATERY EYE:

WITH ILLUSTRATIVE CASES.

THE anterior surface of the eye is preserved in a constantly humid and clean condition by the tears, which are secreted by the lachrymal gland. After the performance of these offices, which are essential to perfection of vision, the tears then flow through two minute orifices (the *puncta*)—which are respectively situated on little eminences at the inner extremity of the tarsal cartilages—into the excreting lid canals (*canaliculi*), thence into a small reservoir, the lachrymal sac, and along the nasal duct to the nose. In a word, the eye possesses complete apparatus for its irrigation and drainage.



Sketch of the tear-gland and eyelids, with a vertical section of the *puncta* (*p p*); *canaliculi* (*c c*); *tear-sac* (*s*); and *nasal duct* (*d*).

The upper third of the nasal canal from its pouch-like form, has obtained the name of *tear-sac*; the remaining portion that of *nasal duct*. The extremity of the latter opens under cover of the lower spongy bone, and is protected by a fold of mucous membrane, which has been considered by some anatomists to act as a valve: it prevents the ingress of foreign bodies.

The breadth of the nasal duct varies. Ware states that in some of his dissections it was as large as a goosequill, but more generally of the diameter of a crowquill. Its axis is also very different in individuals, a point which should not be forgotten in the surgical treatment of the canal by dilating instruments. The nasal duct is incased by bone.

The lid canals or *canaliculi* are generally described and delineated as entering the sac by distinctive openings, but in some subjects they coalesce at their inner extremity and emerge by a common orifice. The *canaliculi* are sufficiently capacious to hold a probe of one-twenty-fifth to one-twentieth of an inch diameter. The curves formed by them in their course from the puncta to the sac are subject to considerable modification in different subjects.

The *puncta*, which possess the attributes of sphincters, are turned towards the surface of the eye, which prevents their occlusion when the lids are closed in sleep; it is also the position that best adapts them for carrying off the lachrymal and other secretions from the ocular surface by capillary attraction.

PATHOLOGY OF CHRONIC EPIPHORA.

When the excreting lachrymal canals become either narrowed, strictured, or otherwise obstructed in any part of their course, tears collect at the inner corner of the eye, and the condition technically termed epiphora, *stillicidum lachrymarum*, or, in simple language, "watery eye," exists.

When the lining membrane of the lachrymal sac is irritated, either from distension of the tears or some constitutional derangement, mucus or pus—one or both—is secreted, and, unless well diluted by the tears, its escape by the

natural passages is retarded. Consequently the sac is prone to become dilated, and generally remains so until relieved by the formation of an abscess, which, if followed by a permanent fistulous aperture, produces a natural cure, though at the expense of much annoyance to the patient.

I have discovered denudation of the periosteum of the bony canal in a few instances where the secretions have been pent up in the sac, and have obtained only a tardy and imperfect vent.

A carious state of the canal is, according to my experience, a disease of rare occurrence.

The *seat of stricture* in the lid-canals (*canaliculi*) I have found, in a few instances, to be near their middle, but in by far the greater number close to the tear-sac. Lower down it frequently occurs at or near the point where the latter merges into the nasal duct,* and also at the terminal extremity of the duct.

The cases which demand much patience on the part of the surgeon, and faith in the new method, are those of adults affected with old standing epiphora, and in whom the lid-canal is strictured close to the sac, the remainder of the excretory apparatus being so much contracted, probably from functional inactivity, that a No. 4 probe, when inserted into the duct, gives the impression of being firmly wedged.

Where a style has been worn, or a tear-fistula of old date is present, and sometimes in the absence of any apparent cause, the walls of the sac are found partially adherent, or much collapsed, so that considerable resistance is offered to the entrance of a silver sound of one-thirtieth of an inch diameter. This resistance is altogether different, and easily distinguishable from the sensation experienced by the surgeon, when in elevating the silver sound to the perpendicular it slips from the mouth of the sac to the floor of the canaliculus. In this latter case the hand of the operator detects a soft and yielding obstacle. The exertion of force here would

* Janin describes the appearance on dissection of a stricture, which he says resembled the plaited folds of the wrist of a shirt sleeve.

tear the parts from their natural connexions; while in the other class of cases, if judiciously applied and well directed, it is the first and essential step towards effecting a cure. During the exercise of this pressure, and before the obstruction has given way, the integument of the lid is thrown into large and deep furrows, which radiate outwards from a spot opposite to the point of the sound within the sac. Whereas if the point of the instrument has not gained entrance into the sac and has slipped away from the canalicular orifice in the manner just described, the skin over the *tendo oculi* only is moved, and no large wrinkles are formed.

In some of the instances where the sac has supplicated before coming under surgical observation, considerable mischief has been done to the membranous walls of the nasal duct. This condition is discoverable by the freedom with which the probe may be moved backwards and forwards on the floor of the nose. The instrument, instead of being tightly pressed against the brow, as in the healthy subject, has a tendency to fall forward. The abscess has appeared in certain cases to have the effect of softening and destroying the stricture. The mere fact, however, of the patient having been able to press the contents of the distended sac into the nostril, *prior* to the occurrence of suppuration, must not be taken as decisive proof of the absence of an obstruction. The exploration of the passages with a silver sound, one-twentieth of an inch diameter, passed through the slit punctum and canaliculus has been the means of acquainting me with the efforts made by nature after the occurrence of an abscess to effect the gradual restoration of the nasal canal to its normal dimensions.

In the last eleven years only two cases of epiphora which were referable to the presence of a *polypus* in the nose, have come under my notice at the Birmingham Eye Infirmary and elsewhere.

No *age* is exempted from epiphora. In a young gentleman of nine years, who was recently under my care, it had existed from his birth. I found the left lower canaliculus

closely strictured at its sac extremity, which required division with the canula lancet before a probe could be made to enter the sac.

Dr. Mackenzie considers the congenital affection to be referable to an imperfect development of the excreting canals—an opinion which derives support from the subsidence of the epiphora, in certain cases, about the age of puberty. The *hereditary* nature of watery eye has not been, I believe, noticed by authors, and is therefore probably of rare occurrence. I am acquainted with a family in which three of five brothers were affected in childhood, and who, though now past the meridian of life, are still annoyed by it when exposed to the wind. One of them has seven sons, five of whom have manifested a similar disorder of the excreting tear functions.

Some cases of epiphora are dependent solely on a displacement of the punctum outwards, and are curable by converting a portion of the lid canal into a permanent groove, the inner or nasal extremity of which groove is sufficiently close to the eyeball to carry on an efficient ocular drainage.

This eversion of the punctum is not an infrequent disorder, and is, I would remark, often met with in conjunction with some one or more of the obstructions already noticed. (Case XIX.) Hence it will always be expedient to explore the whole length of the derivative canals, and observe the state of the Schneiderian membrane, before giving an opinion as to the time that will be required to effect the cure of an epiphora which at first glance appears to owe its origin to a displacement of the punctum.

TREATMENT.

The surgical expedients devised for the relief of epiphora are numerous, and evince much ingenuity. Those which have proved the most beneficial are based upon the principle of mechanical dilatation; some likewise affording relief, as Mackenzie and Vidal suggest, by exciting capillary attraction. In certain methods the instruments employed have been introduced by the natural, in others by artificial, openings.

J. L. Petit was, I believe, the surgeon who first devised the plan of opening the sac through the integument which covers it, and then inserting a wax bougie in the duct.

Beer gradually dilated the duct with catgut bougies of various sizes, which he introduced after the manner of J. L. Petit; but, when a tear-fistula existed, he availed himself of it, enlarging the aperture when it was necessary, as a means of ingress. As soon as the passages were believed to be free, the bougie was withdrawn, and measures taken to heal the wound. The chief objections to this plan are, that it treats a part only of the excreting apparatus; and in the event of failure, it obliges the infliction of a fresh wound (*i. e.*, supposing the surgeon has succeeded in closing the first one, which was prone to become fistulous), with a repetition of the whole process *ab initio*. Moreover, it is by no means easy, as I know from experience, to hit upon the direction of a much contorted canal, when the probe is introduced from the outside of the lid. It embodies, however, a very important principle: gradual dilatation of the stricture, when such existed in the path traversed by the bougie.

The methods of Petit and Beer, there can be no doubt, suggested the employment of the silver nail-headed style. The inconveniences attending its wear are well known to

surgeons, and had led me, previous to an acquaintance with the new method of treating lachrymal obstructions, to abandon its use among the labouring poor.

The insertion of a style, or tube, through an opening made in front of the sac, below the tendo oculi, has, Mr. Bowman remarks, been the last and common resource in obstinate cases where the disease has worn out the patience of the sufferer and the surgeon. It is an expedient so objectionable in itself, as never to be resorted to until the last moment. It is unsightly, especially in females; it is painful, and the patient has constantly to wipe away the discharge escaping by the orifice. The puncture made to admit the style is also frequently followed by the formation of an abscess outside the sac, spreading under the orbicularis muscle, and apt to grow into that serious complication, a sinuous ulcer, for the cure of which free division, and sometimes excision of the overlying skin, is necessary.

Ponteau* about a century since, had, under his care, a young lady to whom, he says, he did not dare to propose an incision in the skin of the lid. In this dilemma the idea struck him, and he carried it into practice, that the sac might be opened from the inner side of the lower lid, near to the caruncle.

This ingenious suggestion Lecat supplemented with the introduction of a tent or mesh of charpie into the duct by means of a small, flexible, and eyed probe.

Laforest and Gensoul altogether avoided the pain of the knife, and the disfigurement of an external wound, by employing curved sounds, which they introduced at the nasal orifice of the duct.

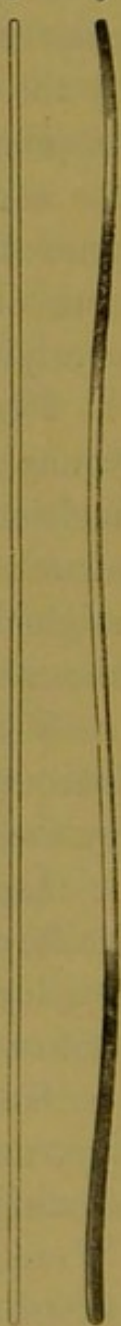
Gensoul gave particular attention to the form of his instruments, the curves of which he had worked from castings of the passages they were designed to dilate. Were it not that stricture has its seat in parts to which these sounds cannot gain access, their employment would be followed by very good results. The late Mr. Morgan

* *Mélanges de Chirurgie*, p. 100. Lyons: 1760.

bears favourable testimony to this method in his *Lectures on Diseases of the Eye*.

To Anel is due the merit of having probed the puncta and the tear-canals in their entire length ; but in consequence of his instruments being only the diameter of a bristle, they are almost ineffective as dilating agents, while their pliability and tendency to get caught in the mucous folds render them very fallacious exponents of the pathological condition of the canals.

A moment's consideration of the preceding methods will lead to the conclusion that each possesses some one or more points of advantage, and, as has been shown, presents certain defects which their inventors failed to remove. The advantages may be enumerated as gradual dilatation of the strictured duct; the introduction of the dilating instrument by an invisible and natural aperture ; the employment of sounds curved to the normal direction of the duct, and of sufficient strength to force an obstruction ; and the use of a single instrument for the examination of the lid-canals, sac, and duct. It was not, however, until November, 1857, that the profession were made acquainted with a mode of treatment which combines all the desiderated points stated above, and affords others which they do not present. The originator of the plan was my eminent friend, and former fellow student, Mr. Bowman. It consists in the slitting up of the punctum and its canal as far as the caruncle, which, if the precaution of passing a probe along the incision is observed for a few days, becomes a permanent groove, through which a probe one-thirtieth, one-twenty-fifth, or one-twentieth of an inch diameter, can be readily passed into the sac and down the duct to the nasal cavity. By this expedient, simple as it is effectual, the whole of the excreting tear apparatus is com-
3 5
4 6



bent near their extremities in such a manner as to allow the surgeon to adapt them to the tortuous passages they are intended to traverse, and, by rotation on their long axes, make search for the orifice of the nasal duct.

The instruments are of sufficient size for the efficient dilatation of a stricture wherever situated; and of sufficient strength to overcome an obstruction when it is dense and does not yield to slight force. Their points are obtuse and consequently little liable, if proper precautions are taken, to be caught in the mucous folds. From what has been said it will be evident that all the defects appertaining to Anel's probes and plan of treatment have been completely overcome. In addition to the process of dilatation, which is to be repeated according to circumstances, such constitutional and local remedies should be employed as the peculiarities of each case may appear to require. At the time of the publication of his paper in the first number of *Ophthalmic Hospital Reports*,* to which the reader is referred for much valuable information, Mr. Bowman did not appear to have been aware of the capability of his plan of treatment to cure epiphora in instances where a sac abscess had formed, or a style had been worn. It will be seen on reference to the annexed cases that I have succeeded in giving unequivocal relief in this class of disorders. And I would remark that the present paper is based on observations made upon sixty-four patients whom I have submitted to the new treatment since December, 1857.

Mr. Bowman, in the paper to which reference has been made, recommends the punctum and canaliculus to be divided upon a silver probe, with a Beer's cataract knife. Finding this method very inconvenient, I was led to abandon entirely those instruments, and substitute for them a pair of obtusely pointed Maunoir's scissors, with narrow and short blades. A notice of my plan of procedure appeared in the *Medical Times and Gazette*, for Feb. 20th, 1858. A finely grooved director and a Beer's knife is commonly employed for the

* London: 1857.

same purpose. I have often used them, but more frequently scissors, which have the advantage of securing a perpendicular incision, as well as causing little pain and alarm to the patient. Where the tissues have become thickened and indurated in consequence of past inflammation, the scissors are immeasurably superior to any other instrument. In many instances of late I have selected for this little operation narrow bladed scissors, slightly curved on the flat, with obtuse points. I find them more easy of introduction than Maunoir's.

To effect the division of the punctum and its canal as far as the caruncle, the patient should be seated and recline the back of his head upon the breast of the operator, the latter tightly stretching the lower lid—say of the right eye—towards the temple with one of the fingers of the left hand, and at the same time slightly everting the inner extremity of the tarsal cartilage. This mode of manipulation tends to throw the punctum and its canal into a line, and allows the point of the lower blade of the scissors to be easily introduced. It is essential that the surgeon should bear in mind the anatomy of the parts, and be careful to glide the blade with its edge well up against the roof of the canal, until the extremity of the instrument reaches a point opposite the caruncle, when the scissors must be closed. Before the canal is divided it should be explored with a probe, in order that the direction of it in the lid, and the presence or absence of stricture, may be determined. In some cases I dilate the punctum with a conical probe before slitting it up.

To explore the excreting apparatus the lid must be drawn outwards as before, and a No. 5 or No. 6 sound gently pressed along the canaliculus in a horizontal direction until it reaches the inner wall of the tear-sac. If before arriving there the instrument meets with an obstruction, it should be rotated, and a trifling difference of direction given to its point. When the stricture is close to the sac, pressure upon it by the sound causes the skin over the tendo oculi to move, and a soft elastic resistance is felt. So long as such

an impediment exists, no attempt must be made to bring the sound to the perpendicular, and to force it into the sac, or the parts will be torn. The proper plan, if it resist dilatation, is to divide the stricture with a sharp-pointed probe. The canular lancet, devised by Mr. Bowman for the purpose, is a useful but rather expensive agent.

The sound having arrived at the inner or nasal side of the sac, and the surgeon having assured himself that he has not pressed the outer against the inner membranous wall of the cavity—which is to be avoided by keeping the lid on the stretch—it is to be raised to the perpendicular and gently pushed down in the direction of the nasal canal, advantage being taken of the curve in the sound, and of the power of rotating it on its long axis, to search out the orifice of the duct.

It will be advisable for the student to abstain from the exertion of force in any case until he has become familiar with the direction of the nasal canal, which is subject to much variation in different persons; and with the action of the bent sound, which can be made in the hands of an experienced operator to thread its way along the intricate inflections of the duct. Our eminent countryman, Percival Pott, in the first volume of his *Chirurgical Works*, strongly insists upon the importance of delicacy of manipulation, and of the surgeon bearing in mind the analogy which subsists between disease of the parts under consideration and that of the urethra. This analogy has also been frequently noticed by many continental writers, but the merit of suggesting a *methodus medendi* in consonance with it was reserved, as I have before said, for an English surgeon of the present epoch.

To return to the catheterism of the excreting canals: if a No. 6 sound will not pass, a No. 5 or No. 4 must be tried. Nothing is gained by proceeding too quickly; indeed violent stretching, even though unattended by contusion, as is apt to be the case in that part of the canal which is surrounded by a narrow, osseous, and consequently unyielding case, seems by exciting irritation to retard the recovery of the duct to its natural diameter.

When the brow of the patient is markedly prominent, I find it necessary to proportionately increase the curve of the sound, which facilitates its admission into the sac, and prevents the mischief which would otherwise be inflicted upon the posterior wall of the nasal duct.

In the majority of patients the treatment is successfully conducted through the lower *canaliculus*, while in others it is only after the upper canal has also been rendered free by the treatment that the epiphora subsides.

In some few cases where the drainage of the eye has been nearly, but not quite, perfect, I have simply slit the upper canaliculus without resorting to the use of the sounds; but not very often, I confess, with decided benefit. It is requisite in all cases to examine carefully, both before and after the division of the lid canal, whether the punctum or the nasal extremity of the channel is adapted with sufficient closeness to the globe to draw off the tears into the sac. When such is not the case, and it is dependent on a thickening of the inner lip of the divided canaliculus—a result of inflammation which commonly causes eversion—I excise a small bit of the thickened part, so as to obtain the proximity essential for proper excretion. The rapidity with which this wound is repaired, even in persons constitutionally feeble, has often surprised me, and suggested the propriety of abscising a larger portion.

In addition to the mechanical dilatation which requires to be maintained from a quarter to half an hour, and repeated according to circumstances once, twice, or thrice a week, such constitutional and local remedies, as has been already shown, should be used as the peculiarities of each case may seem to indicate.

The new treatment has not only the effect of relieving the frontal headache and other distressing symptoms which attend distension of the tear-sac, and of curing stricture of the canals, which, I may remark, are generally of an inflammatory origin; but, also, of restoring their mucous linings to a more healthy condition; thereby correcting both the

morbid discharges which are secreted by the canaliculi and sac, also the irritation of the conjunctiva which is attendant upon their presence.

Where chronic inflammation of the sac has been complicated by a tear fistula, I have always failed to overcome the tendency to the formation of puro-mucus, even although the passages have been free from stricture, until I had obtained by cauterisation the healing of the fistulous aperture.

It is advisable in cases of stricture of old date to occasionally practise dilatation of the canals, even when the excreting functions are being duly performed, as there is a tendency to a reproduction of the stricture.

Struma, constitutional syphilis, habitually feeble health, and chronic gastric derangements, attended as they frequently are by either chronic congestion, or a thickened condition of the membrane lining the derivative tear-canals, and a disposition to recurrent catarrhal affections, are the complications which interpose special difficulties to the attainment of a perfect cure; but by no means preclude a larger measure of relief and comfort being afforded than by any other means at present known to medical science.

A more serious class of cases in which the osseous canal is diseased, or the sac enormously distended, will require other treatment than that which I have described.

CASES.

Case I.—Chronic inflammation of the tear-sac of four months' duration, in a child two years of age: operation under chloroform; rapid relief.

A healthy-looking child, aged two years, was brought to me at the Eye Infirmary, from Barford, near Warwick, on January 28th last. The right tear-sac discharged purulent matter, and on the lower lid was observed a

horizontal and linear cicatrix—the result of an abscess formed four months ago; since which, the eye had watered and moistened the cheek. Local astringents were prescribed.

February 4th. While the child was drowsy from the inhalation of chloroform, I slit the punctum and canaliculus of the affected eye, and directed the mother to press out the sac contents several times a day. Half a drachm of cod-liver oil was ordered to be given twice a day.

February 18th. Tears alone were discharged, and those only occasionally. A No. 4 probe passed with ease through the canals, which were quite free.

The case was soon cured, and is here related as evidence, that patients of tender years may be advantageously submitted to the plan which it is the object of the present paper to illustrate.

Case II.—Epiphora of five years' duration cured in a day.

Mrs. C. W., aged 45, a remarkably healthy person, had suffered from a watery eye (left) for five years. The tears ran over on to the cheek, and the conjunctiva of the lid was inflamed. Small print was read with difficulty. On passing a fine probe of the diameter of a bristle, a stricture was detected in the canaliculus, near to the sac.

On March 31st, 1858, I divided the tear-punctum and canaliculus as far as the caruncle with a pair of narrow-pointed Maunoir's scissors, and probed the canals (left) with No. 6. Since this, the tears have ceased to collect, and she now reads small print and threads a needle with ease.

Case III.—Nine years of epiphora cured in a month.

Miss C. D., 50 years of age, had suffered from a collection of tears at the inner corner of the eyes, and on the lower lids, for nine years. During the last two, the discharge from the tear-sac had been, when pressed out, of a gummy consistence. When she came under my care, there was a lake of tears in

each eye. Local astringents, and tonics internally, were employed for six months.

March 30th, 1858. The largest-sized probe (No. 6) was passed through a stricture in the neck of the sac on the right side, and pressed down to the floor of the nose. The instrument was tightly embraced by the walls of the canal. The left canal was also probed (No. 6): the seat of stricture in it was close to the nasal cavity.

In two days the epiphora was much relieved, and in less than a month a cure was effected. I saw this lady in November, 1858, and she had not suffered a relapse.

Case IV.—Epiphora may continue for a time, notwithstanding the excreting apparatus is to a full-sized probe normally patent.

Mrs. M., a pale healthy woman, of lax fibre, aged 29, suffered, when nine years old, an attack of small-pox, since which her left eye has been affected with an accumulation of tears, which collected at its inner angle, and streamed down the cheek.

A probe was passed through the slit canaliculus, for the first time, on August 31st, 1858; and, on its being carried into the nose, the nasal duct was found to be narrower than normal, and much constricted at its lower orifice. By September 21st, a No. 6 probe traversed the whole length of the canals with freedom. No improvement, however, took place in the epiphora till October 15th, when, for the first time, there was a diminution; and, on the 22nd, the eye was normally irrigated by the lachrymal secretion. The patient continued under observation for several weeks. No relapse occurred.

Case V.—Epiphora since birth: cure; relapse from continued crying.

Master C., a delicate, fair-complexioned boy, 9 years of age, diathetically strumous, had had a collection of tears

on the lower and inner corner of the left eye ever since his birth. Pressure upon the sac caused tears and mucus, mingled with a little pus, to escape by the upper punctum.

April 1st. I slit the lower canaliculus with a knife and grooved director; but, in consequence of a dense stricture close to the tear-sac, a probe could not be passed until it was divided by the canula-lancet. This proceeding was obliged to be delayed some little time; hence the upper punctum and canaliculus were divided, and a No. 4 probe passed down to the floor of the nose.

At the end of six weeks' treatment with the probes, aided by constitutional remedies, the tears were properly excreted; and, on May 29th, the patient returned to the country cured.

It is worthy of remark, that it was not until both canaliculi were free from stricture, that the slightest apparent progress was made toward recovery.

After the Midsummer holidays, the little patient was sent to a boarding school, and, being unhappy, daily gave way to floods of tears, which, by exciting irritation in the excreting passages, reproduced the epiphora. A case has recently come under my care, in which weeping proved to be a primary cause of epiphora, followed by tear-abscess.

Case VI.—Epiphora of a year's duration: cured in nine days.

Miss J., of healthy constitution, has had epiphora for upwards of twelve months, and has been treated for it by an eminent provincial oculist for half a year, without experiencing much amelioration to the tear-symptoms.

After dividing the lid canal I detected a stricture in it close to the tear-sac. This was on the 28th of February of the present year. In five days the collection of tears was much diminished: and in four days later the epiphora was cured. Dilatation had been practised four times.

April 29th. No relapse.

Case VII.—Epiphora two years: dilatation practised five times; cure.

A bridle cutter, aged 56, residing at Walsall, had a watery eye (the right) for two years, which he referred to an inflammation of the lids.

The new treatment was commenced on the 15th of February of the present year. A stricture was discovered in the lower canaliculus, nearly opposite to the caruncle. On the 1st of March the epiphora was only excited by a cold wind: on the 11th the patient was discharged cured. The dilatation was practised five times.

Case VIII.—Epiphora of five years' duration: cure.

The senior surgeon of a county hospital, aged 61, came under my care on the 12th of February, 1859. He had been annoyed for the last five years by a copious epiphora. His mother was, he said, affected in the same way for nearly the whole of her life. After the usual operation I with some difficulty passed a No. 5 sound through a much contracted sac, and a dense stricture situated near to its lower part. On the 17th the eye was less watery and the nostril of the same side more moist. The patient rode ten miles in an open gig on the 10th of March, without disturbance to the excreting functions of the eye; and on the 15th of that month the epiphora had ceased. Dilatation was practised nine times. After a very violent catarrhal inflammation of the nostrils, which caused the patient to keep his bed, the epiphora recurred, but was not persistent, nor so troublesome as it had been. My friend's illness has prevented a recourse to the treatment.

Case IX.—Two years' epiphora cured by division of the lid canal and the use of the No. 6 sound on four occasions.

A healthy woman, 58 years of age, residing at Little Packington, applied on January 28th, 1859, at the Eye

Infirmity, on account of chronic inflammation of the lids and epiphora of the right eye, which had existed for two years. A stricture was discovered in the centre of the lower *canaliculus*, and the tear-sac found to be much contracted. On the 25th of February the lachrymal secretion was perfectly excreted, and has since continued to be so. A No. 6 sound had been passed four times.

Case X.—Epiphora of twenty years' standing : cure.

Mr. B., aged 36, a solicitor, in good health, consulted me on August 22nd, 1858, respecting a tear-abscess on the right side, which was at that time in the stage of delitescence. The eye, he said, had watered for twenty years, but had been specially troublesome during the last five.

August 27th. I divided the right lower punctum and its canal as far as the caruncle, and passed a probe (No. 6). The duct, which contained a quantity of inflammatory effects, tightly embraced the probe: it was most narrowed at its lower fourth.

The patient's profession frequently took him from town; hence his attendance was not very regular. Nevertheless, on November 26th, the coldest wind failed to excite epiphora. In addition to the surgical treatment tonics and a regulated diet were prescribed.

Case XI.—Epiphora five years : tear-abscesses ; an occasional and slight epiphora continues.

H. L., a widow, 35 years of age, has been subject to a watery eye (right) and flowing of the tears on to the cheek for the last five years. In February, 1858, an abscess formed in the tear-sac, which discharged itself through an opening in the skin of the lid, near to the inner canthus. She says "it gathered up and broke every four or five days."

April 13th. I slit the lid-canal with scissors: at the time there was a copious muco-purulent secretion discharged through a fistula in the integuments covering the sac, which

were inflamed and tumid. After a good deal of trouble, a probe was passed into the nasal duct, which was found to be contracted and blocked up with lymph, etc. The probing was repeated twice a week, and the fistula occasionally cauterised. My notes state that, at the expiration of a month, the fistula was healed; the cutaneous inflammation had subsided; and the epiphora was much diminished.

May 25th. The epiphora was slight, and only of occasional occurrence.

The patient was kept under observation for four or five months, the excreting canals doing their duty all but perfectly. A tear every now and then appeared at the corner. The duct was quite free, except at its nasal extremity, where it continued more contracted than natural.

For the relief of a chronic inflammation of the Schneiderian membrane, iodide of potassium and Plummer's pills were given with good effect. It did not, however, entirely subside, being associated, in my opinion, with a specific taint.

Case XII.—Epiphora: distension of the tear-sac; cure.

Mrs. B., aged 50, constitutionally healthy, had had a watery eye (the right) for four years. The discharge ceased spontaneously, and did not return for twelve months. In February, 1858, it was reproduced by an attack of erysipelas (tear-abscess), which commenced at the inner corner of the weak eye.

November 12th. She came under my care at the Eye Infirmary. At this time the sac was prominent, and on pressure a muco-purulent secretion regurgitated through the lower punctum. I performed the usual operation, and passed the largest-sized probe. The examination revealed a slight stricture of the lid canal near to the sac, and a general narrowing of the nasal duct.

The probe was passed two or three times a week; and, on December 31st, the disease was perfectly cured, the eye being dry, and the excreting canals of their normal diameters.

April 8th, 1859. There was no relapse.

Case XIII.—In which the new treatment probably arrested the formation of a tear-abscess.

E. S., aged 21, of scrofulous habit, a resident of Tanworth, came to the Eye Infirmary on November 16th of last year, with an acute abscess of the right lachrymal sac, which was pointing; and with a tumid and highly painful condition of the left, the integuments of which presented a red blush. For two years he had suffered from epiphora.

The right abscess I opened with a bistoury, in the usual manner. On the *left* side I slit the punctum and its canal as far as the caruncle, and then passed a No. 6 probe through the whole length of the ducts. Pus oozed out from the side of the instrument. The patient was ordered to take quinine, a generous diet, to poultice the abscess, and use a lead lotion to the left lids.

November 20th. The probe was again introduced, with the effect of rendering the passages free, and of curing the epiphora which had existed for two years.

November 30th. The *right* lower punctum and canal were divided in the usual manner. At the expiration of three days, the parts were more healthy, and the epiphora diminished. A No. 6 probe was passed to the floor of the nose. The parietes of the duct were found much damaged: they were broken down, so that the instrument lay loosely in it, and fell away from the forehead.

December 14th. The eye (right) watered only when exposed to cold and wind; yet puro-mucus was regurgitated when the sac was pressed.

December 28th. The left eye continued well and dry. The discharge in the right sometimes finds its way into the nose.

January 4th, 1859. By the probe, I ascertained that the right nasal duct was undergoing repair.

January 11th. To day, for the first time, the probe was pretty firmly fixed against the bow, indicating that the sac and duct were rapidly recovering their normal dimensions.

The discharge consisted of thin glairy mucus. The eye watered only when exposed to out-door cold.

Since December 22nd the greater part of the sac-secretions, etc., have passed into the nose. The left eye remains quite well.

January 18th. The right duct has recovered its calibre. For the last fortnight the epiphora has been cured.

April 29th. There is no relapse. The sac has almost recovered its normal dimensions.

Case XIV.—Dilated sac: epiphora: tear-abscesses: speedy relief by the new method. The following case I recently attended, in consultation with my friend Mr. Yarwood, of Aston Manor.

Mrs. P., aged 61, for many years a valetudinarian, and of feeble constitutional power, had suffered for six years from an accumulation of tears and mucus in the right lachrymal sac, which she, at my suggestion, emptied two or three times a day by pressing its contents into the nostril. For the last two or three years tears had passed over the lid on to the cheek.

On September 30th, 1858, after walking in her garden, she felt chilly with aching pain in the sac. On the following day, the eye felt as if it would burst. On the third day, a tear-abscess discharged itself through the skin of the face. The suppuration recurred twice in December: on the last time the abscess broke before I saw the case, which was on the first day of the present year (1859). At this time, the lid presented three fistulous openings. The skin over the sac was elevated, pinkish, and puffy. It was agreed, in consultation, that I should slit the lower punctum and its lid-canal; and that some local application, of an astringent and alterative kind, should be used to the eyelids. A stimulating ferruginous mixture was also prescribed.

January 5th. The fistulæ were healed. A No. 4 probe was passed to the floor of the nose through a stricture near to the middle of the nasal canal. We determined to

apply a small blister behind the ear, and to commence on the following morning the daily application of a weak solution of nitrate of silver.

We were told that since the use of the probe on the 5th the eye had not watered. A No. 6 probe was passed, without encountering a stricture; and the same operation was repeated on the 15th, although no epiphora had occurred. On this day the passage was free.

February 26th. No relapse.

Case XV.—Right tear-sac distended by inspissated mucus to the size and shape of a small almond: no regurgitation through the lid and nasal canals; immediate relief to all the symptoms.

A young woman, whose tear-sac from being in the state noted above seriously marred a pretty face, was placed under my care on the 24th of February by my friend Professor Berry. No amount of pressure sufficed to evacuate any of the contents of the tumour. In early childhood the measles left the right eye watery, and it had so continued. Two years ago the eye inflamed, and, at the end of the year, the deformity at the inner corner of the eye first appeared; it had gradually grown to its present dimensions. An exploration of the passages through a slit canaliculus discovered an impervious stricture of the inferior lid-canal, close to the sac; and, after this had been penetrated by a sharp-pointed steel probe, the silver sound No. 4 passed into the sac, and with a snap through two strictures in the nasal duct. The contents of the *mucocele* (the name given to this class of lachrymal tumours by ophthalmic writers) were readily pressed down into the nose; a small quantity regurgitated through the inferior punctal canal.

On the following day a No. 6 probe was passed easily through the excretory apparatus, which was not removed for half an hour.

On the morning of February 27th no mucus was found

to have collected in the sac during the night. The patient had carefully carried out the directions to press the sac from time to time during the day. There has not been any return of the deformity since the operation was performed.

Case XVI.—A silver style worn six weeks: return of epiphora; cure by the new method; dilatation employed three times.

Mrs. F., 40 years of age, about five years and a half ago had a silver style inserted into her left nasal duct, for the relief of a watery eye which followed a tear-abscess. At the end of six weeks the style was removed, and in consequence of some difficulty attending its replacement was not again used.

On the 25th of February, 1859, she applied to me in consequence of epiphora having returned for the last six months. The usual operation on the punctum and canal was performed. A No. 4 sound could only be got as far as the sac. Eleven days later I succeeded in passing the sound through the nasal duct to the nose. Since then the eye has not been affected with epiphora. On the 25th of March I succeeded in dilating the canals with a No. 6 sound, and on the 26th of the following month I repeated the operation, although the drainage of the eye was perfect.*

Case XVII.—Occlusion of the right lower punctum: chronic tinea tarsi: epiphora on both sides: cure.

W. B., aged 18, of scrofulous habit, was admitted under me at the Eye Infirmary on November 5th. He had suffered from chronic inflammation of the lids (tinea tarsi) for the last nine years, which had much thinned the eyelashes; and from epiphora on both sides for the last five or six, the disorder being most troublesome on the right side. The sight was complained of as being dim. The right lower punctum was covered over by thin integument, and the upper appeared to have closed. The course of the canaliculus of the former was indicated by a pale streak in the conjunctiva,

* Mr. B. Bell, of Edinburgh, has succeeded in curing a similar case to this.

contrasting with the vascular condition of the rest of that membrane. I divided with a scalpel the inferior lid-canal, in a transverse direction, at about two or three lines from the occluded punctum; but was unable to discover either of the cut orifices till four days afterwards, when I slit the canal as far as the caruncle, and in about a week acted in the same way on the punctal end. The left canal was also slit. On each side the excretory apparatus was throughout much narrowed, especially on the right side, which had been the more inactive. With difficulty a No. 4 probe was passed. The left nasal duct was much constricted at its nasal meatus.

This youth submitted twice a week to the process of dilatation, and in nine days the eyes watered only when exposed to cold wind; and on December 31st he was cured. At this date the superior punctum was for the first time observed to be patent: it was exceedingly small. The "tinea" was nearly well. In addition to these means cod-liver oil was given, and the usual treatment for tinea put in force.

The patient was directed to attend occasionally at the institution, that the canals might be kept free by the passage of an instrument.

February 8th. No relapse had occurred.

Case XVIII.—Supernumerary punctum on the lower lid: epiphora; cure.

Mrs. R., aged 46, applied to me at the Eye Infirmary on January 25th, 1859, on account of an epiphora of the right side, of two or three years' duration. While examining the inferior punctum and canaliculus with a fine probe, previous to dividing them with scissors, I discovered an orifice on the margin of the lid directly opposite the centre of the caruncle, which would just admit a probe of the diameter of a bristle, and which communicated with the tear-sac by the canaliculus. The patient declared that neither inflammation nor abscess had attacked the part: of the watery state of the eye, she could afford no explanation. I conclude the supplementary punctum to have existed at birth.

February 4th. The epiphora had ceased.

February 26th. It has not returned.

Case XIX.—Epiphora twenty years : displacement of the puncta ; stricture of the lid and nasal canals : cure of one side.

W. T., 24 years of age, edge tool maker, applied to the Eye Infirmary, December 31st, 1858.

His eyes have watered since he had small-pox twenty years ago.

The inner third of the inferior tarsal margins are thickened, cutaneous, and rounded ; and the lower puncta everted so that the tears do not reach them. The palpebral conjunctiva is quite healthy. Pressure on the sac occasioned a regurgitation of tears, which are constantly collected at the inner corner and along the borders of the lower eyelids. From these appearances it was reasonable to expect that the usual operation by placing the efferent lid-canals at working distances from the globes would be followed by immediate amelioration to the symptoms. The sequel will show this not to have been the case, and the reason why.

December 31st. Divided the puncta and canals with scissors.

January 4th. Right side : stricture in centre of canaliculus and at bottom of sac ; a No. 4 probe did not reach the floor of the nose. Left : no stricture in lid-canal, but the probe could not be made to enter the sac.

January 7th. Passed No. 6 through a long and dense stricture in the right nasal duct. Left side : passed No. 6 through a rigid stricture just below the union of the sac with the duct.

January 11th. The epiphora is occasional in place of being constant.

January 14th. The tears pass into the nose.

January 18th. Tears do not collect at inner angles.

February 11th. Occasional epiphora when at work. In his employment a fine metallic dust pervades the atmosphere.

February 18th. The left eye is dry. The passages on

both sides are free. Conjunctivitis of the right. Ordered to leave his work, which it is believed irritates the conjunctiva, and so prevents the completion of the cure.

March 8th. The left eye is dry. Less epiphora of the right. Has not attended since this date.

Case XX.—Displacement of the puncta on the left side: ectropion of lower lid: epiphora: eczema (?) of the palpebral integument: cure.

The above conditions had existed in a poor Irishwoman, aged 56, for many years.

On the 8th of December, 1858, she came under treatment at the Eye Infirmary. On the 4th of the following month I slit both puncta and canals, and excised a horizontal piece of the conjunctiva of the lower lid. At the expiration of a week the excreting ducts were probed with a No. 6 sound, and solid nitrate of silver was applied to the inferior palpebral conjunctiva. On the 25th of February the eversion of the lid, the skin disorder, and the epiphora were perfectly cured and the patient discharged.

The sound was passed four or five times.

NOTES ON SOME OF THE DISEASES OF THE TEAR-PUNCTA.

It is impossible to investigate cases of epiphora without having the attention attracted to certain changes which affect the *puncta*. These changes, which are for the most part referrible to inflammation of their structure and of the canaliculi, or the tissues which surround them, may be briefly described under the following heads.

1. *The patulous punctum.*—The *puncta* sometimes lose their sphincter power and become *patulous*. In an old man who was recently under my care, the left lower punctum readily received a sound one-twenty-fifth of an inch diameter. This atonic condition often exists quite independently of

stricture in the canaliculus. I have slit up the punctum and lid-canal in all instances where there was an attendant epiphora, with marked relief.

2. *The obliterated punctum*.—A converse condition to the above affection, in which the aperture is *obliterated*, may be said to be of rare occurrence, if we exclude instances which are of traumatic origin, and some examples of *lippitudo* (blear eye). It is remarkable that epiphora is frequently absent in this class of cases; but when present the treatment adopted in Case XVII will be appropriate.

3. *The contracted punctum*.—Contraction of the punctum to such a degree as to render the orifice invisible to the eye of an observer, even with the aid of a powerful magnifying glass, is not infrequent. In two cases I searched many times during four consecutive weeks for the upper puncta before I succeeded in finding them. In one, a son of my friend Dr. Birt Davies, the apertures were displaced: they faced directly forwards instead of towards the eyeball. The puncta, in both cases, became apparent so soon as the dilatation had rendered the nasal and lower lid-canals free.

The contracted punctum is generally attended by a flattening of the papilla in which it is set. In examining these apertures the student should remember that the superior are naturally the smaller.

4. *The displaced punctum*.^{*}—Chronic tarsal inflammation, protracted external ophthalmia, and the congestion of the conjunctiva and its submucous tissue, which occurs in unhealthy and especially strumous persons without giving rise to morbid sensations, are followed by a gradual change in the conformation and dimensions of the edge of the eyelid. Its inner third, instead of presenting two sharp defined margins, is rounded, increased in breadth, and presents a cuticular surface; the punctum, often much contracted, is found on or near to the integumental border

^{*} See an important paper on this subject, by Mr. Bowman, in the *Medico-Chirurgical Transaction* (2nd series), vol. xvi, p. 337.

of the cartilage; and the palpebral irritation is extended to the skin of the lid, which, with the attempts made by the patient to allay it by frequent wiping, causes the cuticle to become more rough and contracted than normal. I have a patient under my care with eversion of the lower punctum consequent on thickening of the submucous tissue of the lid, in whom I can at any time produce this eczemoid condition by applying a feebly-acidulated solution of atropine to the eyes for a few days, and so exciting marked conjunctival irritation and chemosis. Moreover, the cure of the epiphora has been followed, in the cases which I have observed, by the subsidence of the integumental disorder (Case XX). The description given above relates to the lower eyelid almost exclusively. In some of the cases, in order to find the punctum it is necessary to *try* the spot which we conjecture it to occupy with Critchett's grooved steel probe. The orifice is sometimes blocked up with epithelial scales, sometimes cicatrised over, in others contracted to the extent of being invisible.

The punctum may be displaced quite independently of any rounding of the edge of the lid which is simply thickened. In these cases the punctum is set *vertically* in the extremity of the cartilage, and a narrow border of lid substance intervenes between it and the surface of the eye: in some there is also enlargement of the caruncle and thickening of the semilunar membrane.

In the first kind of displacement the new method of treatment and the application of the usual means employed for chronic tarsal ophthalmia or its sequences are followed by very satisfactory results. When there is ectropion, such a procedure as the study of the case may indicate must be adopted:—

In the second, in addition to division of the punctum and canaliculus, and the use of the sound, the inner margin of the channel must be excised. I have met with instances in which it was impossible to obtain a sufficient proximity of the canal until a portion of the caruncle had been removed.