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SOME NOTES AND OBSERVATIONS ON 310 CONSECUTIVE OPERATIONS FOR EXTIRPATION OF THE LACHRYMAL SAC.

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EXTIRPATION OF THE LACHRYMAL SAC.

IN the *Indian Medical Gazette* of August 1905, the writer published the results of 47 operations for the removal of the lachrymal sac, which he had performed in 12 months in the Government Ophthalmic Hospital, Madras. In the present paper he proposes to deal with 310 consecutive operations of the above natures performed on 235 patients, and to discuss the results obtained.

Those operations were performed in hospital and private practice in Madras between May 5th, 1904, and October 8th, 1907 ($3\frac{5}{12}$ years). A number of operations have been since performed and are still coming in, but cannot be included in the present paper. The relief afforded may

in some measure be gauged by the increasing popularity of the operation, as judged of by the following figures:—

From May 5th, 1904, to May 5th, 1905, 47 cases.
From May 6th, 1905, to May 5th, 1906, 98 cases.
From May 6th, 1906, to May 5th, 1907, 125 cases.

The practice of medical officers in the Southern Presidency affords additional and not less valuable evidence. Whereas previous to the publication of the above paper in 1905, there was, so far as one can trace, no record of the performance of this operation, in South India, there are now, to my knowledge, five medical officers who having seen me perform the operation, have themselves adopted it. Three at least of them have written to me, or told me, that they are fully satisfied; it is all that has been claimed for it.

Indication for Extirpation of the Sac.—In the presence of lachrymal obstruction of dacruo-cystitis:—

(1) Dilatation of the sac;

(2) Purulence of the sac-contents;

(3) Evidence of previous attacks of phlegmonous dacruo-cystitis; with persistence of the stricture;

(4) A history of long-standing obstruction, combined with inability or unwillingness on the part of the patient to submit to a long course of probe-treatment; or with a timidity which renders it unlikely that such treatment will be persevered in;

(5) The presence of any indication for an operation on the globe of the eye (especially cataract);

(6) The presence of a septic ulcer in the eye of the same side;

(7) Any factor, occupational or otherwise, which increases the liability of the patient to eye-injury. Not a few of our cases of septic ulcer of the cornea in Madras occur amongst fitters, goldsmiths and stone-masons; in all of the above and in many allied trades tiny chips of hard substance frequently fly up and injure the cornea;

(8) The existence of double lachrymal obstruction with evidence of past or present mischief in one cornea is a strong indication for the removal of both sacs.

It would be almost easier to point out the indications for the old and conservative methods of dealing with lachrymal obstruction and dacruo-cystitis. They may be stated as follows:—

(I) The absence of inflammatory or marked structural changes in the passages; and

(II) On the part of the subject, (1) the courage and patience to persevere through a long, tedious and painful course of treatment, and (2) the means and the leisure to give the necessary time required by the surgeon.

In other words, given an early simple case, in a man of means and leisure, we may adopt conservative treatment, always with the proviso, that failing success, we fall back on extirpation of the sac.

Steps of the Operation.

Preliminaries.—The operation is performed under chloroform, the patient being prepared in the usual way. The sac is squeezed dry of its contents, which are caught and removed on antiseptic swabs; the face is again washed.

The surgeon sits facing the patient's head as shown in the diagram; the patient's head is towards the light, and his feet away from it;

but he is placed obliquely (according to the side), so that the light falls on and illuminates the side of the face on which the operation is being performed. The position of the tray for instruments, of the assistant, etc., are shown in the diagram.

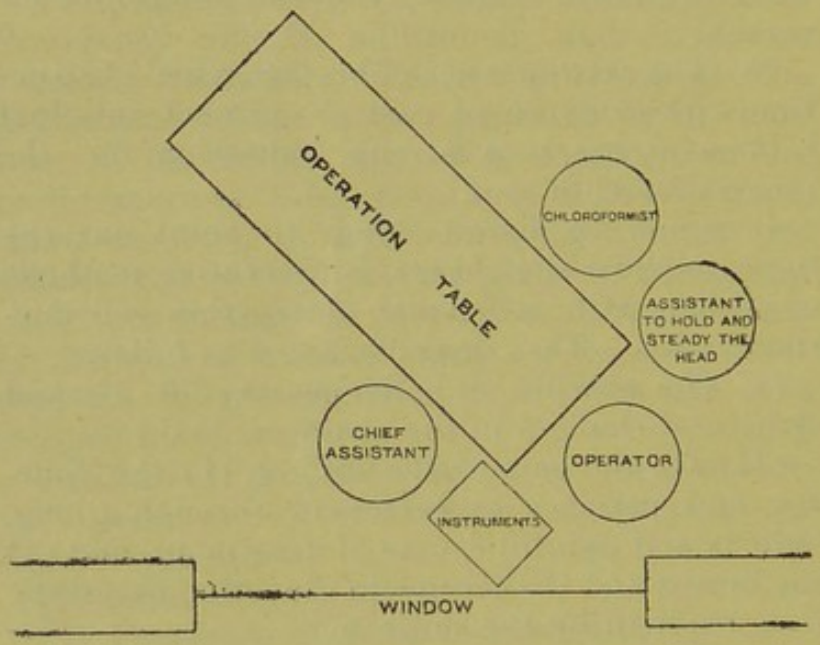

Diagram showing position of Table, Operator, Assistants, etc., for Extirpation of Left Lachrymal Sac.

(1) *Skin Incision.* — Define the internal palpebral ligament by pulling the lids outwards; and make the lower border of this the upper limit of the incision; it is practically never necessary to divide this ligament, and it is most advisable not to do so, as when it is divided there is a risk of deformity after healing. Next, define with the finger the anterior lip of the lachrymal groove, and cut boldly down on to this, following its course, with a crescentic incision first downwards and then outwards. The average length of incision in the 310 cases was 20 mm. Easy cases

only require an incision 15 to 18 mm. long, whilst matted tissues demand much more room (the maximum in any case being 27 mm.).

(2) After separating the lips of the wound by the aid of a Müller's retractor, define the layer of fascia which closes in the lachrymal groove, and divide this throughout the length of the skin incision. This may usually be done with the end of a small sharp elevator. With the same instrument, the sac is separated from the adjacent bone, internally and posteriorly. If not adherent, the sac may also be cleaned with the elevator on its outer side as well, up to the point of entrance of the canaliculi.

(3) The dome of the sac is seized with a fine pair of forceps (conjunctival forceps do well) and drawn firmly downwards, whilst a pair of blunt-pointed scissors curved-on-the-flat, are used to free the dome from its upper attachments (working under the palpebral ligament for this purpose) to cut through the canaliculi, and to follow the sac down into the nasal duct; this duct is divided as low as possible, the sac being pulled firmly up for the purpose.

(4) As large a probe as possible (Nos. 9 to 12 Theobald) is then thrust down the nasal duct, till stopped by the palate pushing any mucous membrane in front of it, and a red-hot spindle-shaped cautery is thrust boldly down the duct, to ensure the destruction of this membrane.

(5) The cavity is dried and examined. The removed sac is carefully examined under water and slit open to make sure that no part has been left behind. If any portions have been so left, they are dissected out; and if necessary the neighbourhood of the dome of the wound is cauterised freely with a ball-shaped red-hot cautery.

The cavity is freely flushed with a 1—3000 solution of bin-iodide of mercury, and the wound closed with three skin sutures. An aseptic pad and bandage closes the eye of the operated side, the other being left free.

The case is dressed on the seventh day, when the stitches are removed and the eye is released.

Hæmorrhage is dealt with by means of pressure and the use of adrenalin chloride solution. Any troublesome bleeding point is touched with the red-hot cautery. For pressure I have always used sterilised swabs of cotton wool mounted on stitches 4 inches long, and about $\frac{3}{16}$ inch in diameter.

When the case is complicated by the presence of a septic ulcer of the cornea, the latter is dealt with at the same sitting. Of many methods tried none give such good results as the use of the red-hot cautery, combined with paracentesis of the chamber. Such eyes are opened daily, and protargol solution (1 to 8) is instilled; atropine or eserine are used as indicated.

Complications met with before Operation.

(1). Acute abscess of lachrymal sac, with phlegmonous inflammation of surrounding face.

(2). Lachrymal fistula.

(3). Ulcer of the cornea, especially of the septic type.

(4). Cataract or other deep-seated disease of the eye.

With the exception of the first, all these have been dealt with elsewhere in this paper. It is the custom here to incise a lachrymal abscess freely, at the same time curetting its cavity, and sponging it out with a solution of perchloride of mercury (1 per cent). When the inflammation has subsided, the sac can be removed; it is

necessary to wait about a month as a rule. In one case the sac was extirpated within a few days of incision. The circumstances of the patient left no apparent alternative, as otherwise she would have gone away and probably soon had a return of the severe inflammation when she was away from medical aid. As a routine measure such haste is inadvisable.

Difficulties and complications met with during Operation.

(I). The terminal branch of the facial artery should be avoided in the first incision, or it causes troublesome hæmorrhage (*vide* my paper, *I. M. G.*, August 1905).

(II). When the lachrymal sac is not dilated or distended, it is not uncommonly bound down into the lachrymal groove by a dense fascia, which appears to be a backward reflection from the tendo-palpebrarum. This fascia is often very dense; farther, when the bridge of the nose is high, and the orbits are consequently deep-set, the plane of this strong band of fascia comes to lie nearly parallel to the median sagittal plane. On the contrary, a low nose-bridge and a flattened type of face throw this fascial plane farther forwards on its outer side, *i.e.*, more into the plane of the face; the obvious result of this latter conformation is to render the wound shallower and the sac more accessible. The former condition has naturally the opposite effect; both the depth of the wound and the plane of the sac tend to embarrass the operator, who may easily burrow outward into the orbit, and mistake a lobule of fat for the sac. Such an accident need never happen, if after a first clean skin incision, the wound is held well open (by a speculum or otherwise), all hæmorrhage is

stopped, the nasal margin of the lachrymal groove is well defined with the finger, and the dense fascia cleanly divided as close to this bony edge as possible. The sac is at once seen lying within its sheath of bone and fascia, and the operation can be proceeded with on the usual lines.

(III). Hæmorrhage may be troublesome at three stages: (1) after the skin incision, (2) after division of the deep fascia over the sac, or during separation of the sac, and (3) from the nasal duct after the passage of the probe down its length. Firm pressure deals most easily with the first and second, aided if need be by a touch with a pointed cautery over any bleeding spot; the last is best stopped by plugging the wound with a cotton wool swab, to clean and dry it, and then rapidly passing a spindle-shaped cautery down the passage, before it has time to bleed again.

(IV). When there has been preceding phlegmonous inflammation and still more when there has been a long-standing fistula, the superficial structures are so matted as to be unrecognizable separately. It may even be difficult to recognize the sac itself. If one cuts boldly down on the anterior crest (naso-maxillary) of the lachrymal groove, and separates the sac from the bed of the groove with the elevator, it is not difficult to seize the thickened sac wall in the grip of a fixation forceps, and then to cut the sac boldly out with the surrounding structures, keeping as close to the former as possible.

(V). When one desires to perform a cataract extraction, or other serious operation on the globe of the eye and the lachrymal passages are found (as tested by dropping fluorescin into the conjunctival sac and examining a handker-

chief into which the patient is bid to strongly blow his nose) to be closed, even though there may be no very obvious retention, the writer thinks that it is safer to remove the sac, before undertaking the more serious intra-ocular operation. In this class of case it is common to meet with a shrivelled, contracted sac, which is tightly adherent to the surrounding parts. If so, the lachrymal groove is opened as usual, the elevator used to free the sac on the inner and posterior aspects and the head of the sac is then seized with forceps, and drawn downwards, whilst the sac is separated snip by snip from the surrounding parts, some of which are necessarily taken with it. The same method is applicable to the cases, where, though the sac can be easily defined anteriorly, internally and posteriorly, it is yet adherent externally to the tissues in its neighbourhood, as the results of long-standing past inflammation. It is a question of operating by feel rather than or at least more than by sight; and it is better to proceed boldly, and if any portion of the mucous membrane is left behind to remove it after stopping all hæmorrhage, when the wound can be freely and well examined. The writer makes it a rule to consider that, if the cavity does not look clean, or in other words, if he is in doubt as to the thoroughness of the operation, the whole of the sac has not been removed. Nothing less than a thorough inspection of the wound should then suffice. A paraffin syringe was obtained for the hospital in the earlier days of this operation with a view to defining the limits of the sac in difficult cases. Before it had time to arrive, farther experience had shown that it was always possible, granted a little perseverance, to thoroughly extirpate any sac. The troubles

of paraffin injection have thus been avoided, though it is conceivable that the use of this method would appeal to some, who have not the opportunity of doing many operations of the kind, and who might on this account be only right to use all possible aids. One cannot but think, however, that the difficulties of the operation have been over-estimated, for out of 325 extirpations performed in this hospital during the last 3½ years, there has been only one in which it was necessary to operate a second time on account of a portion of the sac wall having been left behind ; moreover, the case in question was only the fourth of the series and the writer, before commencing extirpation himself, had only seen one previous operation of the kind (by Prof. Volckers of Kiel).

(VI). When there is extensive and deep ulceration of the cornea complicating the case, it is necessary to be most careful to avoid pressure on the globe during operation; as otherwise the eye may be ruptured with escape of its contents.

Complications met with after Operation.

(1) Recurrence of retention, due to a portion of the sac wall having been left behind at the operation. This occurred only once and in the fourth case of the series. It has already been dealt with.

(2) Failure to obtain primary union of the wound, or breaking down of the wound, after primary union appeared to have been established.

(3) Progress of the septic ulceration of the cornea, for which the operation was undertaken.

(4) A chronic catarrhal condition of the lower lid, which is difficult to treat, but which

yields eventually to patient treatment along the ordinary lines; it is better not to be too active.

NOTE.—The second and third headings have been dealt with at length elsewhere in the paper.

STATISTICS OF 310 OPERATIONS FOR REMOVAL OF THE LACHRYMAL SAC PERFORMED ON 235 PATIENTS, IN MADRAS, FROM MAY 5TH, 1904, TO OCTOBER 8TH, 1907.

(1) *Age Incidence*—

Aged 1 to 20	...	20 patients or	8·51%
„ 21 to 30	...	30 „	12·77%
„ 31 to 40	...	32 „	13·62%
„ 41 to 50	...	84 „	35·74%
„ 50 and above		69 „	29·6%
TOTAL	...	235 „	100·00%

(2) *Sex Incidence*—

Males	...	118 patients or	50·21%
Females	...	117 „	49·79%
TOTAL	...	235 „	100·00%

(3) *Side affected*—

Right side	...	159 operations or	59·21%
Left side	...	151 „	48·71%
TOTAL	..	310 „	100·00%

(4) *Caste*—

Hindus	...	176 operations or	74·89%
Muhamedans	...	18 „	7·66%
Native Christians	...	2 „	0·85%
Non-caste	...	28 „	11·91%
Eurasians	...	10 „	4·26%
Jew	...	1 „	0·43%
TOTAL	...	235 „	100·00%

(5) *Period elapsing* between patient first noticing disease and coming to hospital (stated in numbers of operations)—

Under 1 year	...	156 operations or	50·32%
1 to 2 years	...	63 „	20·32%
2 to 3 „	...	35 „	11·29%
3 to 4 „	...	8 „	2·58%
4 to 5 „	...	17 „	5·49%
Over 5 years	...	31 „	10·00%
TOTAL	...	310 „	100·00%

The histories are very unreliable, and probably *greatly* understate the duration of the disease in a large number of the cases.

(6) *Course of the disease*—

Chronic cases in which there had at no time been abscess formation	258 or	83·22%
Chronic cases in which there had at some time been abscess formation	39 or	12·58%
Acute cases presenting themselves with phlegmonous inflammation	13 or	4·19%
TOTAL ...	310 or	100·00%

(6) *Course of the disease*—

Number of cases complicated with fistula	32 or	10·32%
Number of cases in which at the time of discharge, the patient appeared to have been cured or relieved by the operation ...	308 or	99·36%
Number of cases in which the operation failed to relieve the condition for which it was performed	2 or	0·64%
Number of cases in which, though the patient left hospital relieved, it was known that the case subsequently ended in disaster	1 or	0·32%

The following gives a summary of the notes of the three cases above alluded to—

No. 83. Male Hindu, *æt.* 30; duration of disease four years; for one month complicated by ulcer of cornea; sac thickened, dilated and distended with mucus; it was removed entire; section at once healed, and corneal ulcer also healed steadily for a month; then without any obvious cause ulceration recommenced and panophthalmitis supervened rapidly; evisceration performed a week later.

No. 216. Hindu male, *æt.* 50; duration four years; fourteen days ago was struck on eye by branch of tree, and septic ulcer of cornea rapidly supervened; he had lost opposite eye in the same way one year ago; there was a large central aperture in the cornea, through which the lens presented; sac thick-walled, dilated, distended with pus, and very adherent; operation difficult and prolonged; in spite of care the lens unfortunately escaped during the operation; the skin wound healed, but the eye passed on to panophthalmitis; it was recognised that the case was a desperate one before operation.

No. 259. Hindu male, *æt.* 60, a mason; duration one year; recently (indefinite period) injured eye with stone chip, and septic ulcer supervened; sac slightly dilated and distended with pus; contents expressed and protargol dropped in for nine days; all parts matted; hæmorrhage very troublesome; a difficult operation; wound healed at once, and so did ulcer; was under observation for three and half months, doing excellently in every way, and greatly relieved; he returned one month later with panophthalmitis, cause unknown; evisceration was at once performed.

NOTE.—Cases 83 and 259 illustrate the dangers of septic ulcer, even after apparent healing. In both cases the removal of the focus of infection resulted in healing of the ulcer, but did not eventually save the eye; it is not unlikely that some small accident determined the loss in both cases, by lighting up the dormant activity of the septic organisms in the strata of the cornea, which organisms were responsible for the ulceration in the first place.

INDICATIONS FOR EXTIRPATION OF THE LACHRYMAL SAC RECOGNISED IN THE 310 OPERATIONS UNDER REVIEW.

It is to be taken for granted that Lachrymal Obstruction or Dacruo-cystitis or both were found in every one of the 310 *eyes.*

(1) Presence of septic ulcer of cornea		45 or 14·52%
(2) Presence of the combination of corneal septic ulcer and lachrymal mischief in the opposite eye		12 or 3·87%
(3) Evidence that in the past there had been a combination of severe corneal inflammation, and lachrymal mischief in the opposite eye		2 or 0·64%
(4) Special liability to injury ...		22 or 7·09%
(NOTE.—This figure is probably far too low, as it includes only the dangerous trades, such as fitting, goldsmith-work, carpentering, and stone-hewing; it takes no account of the risks run by cultivators. The latter risks, though very real, are very hard to estimate in individual cases, and the figure given is, therefore, admittedly unreliable).		
(5) Dilatation of the sac ...		172 or 55·48%
(6) Purulence of sac-contents	151	192 or 61·93%
Muco-purulence of sac-contents	41	
(7) History of previous attacks of phlegmonous dacruo-cystitis ...		52 or 16·77%

(8) Presence of a fistula ...	...	32 or 10·32%
(9) Presence of cataract ...	...	83 or 26 78%
(10) Residence outside Madras (taken on the 235 patients)	...	152 or 64·68

NOTE 1.—A very large percentage of these patients would not have submitted to any form of treatment demanding a long stay in the presidency town. It is not possible to reduce this factor to percentages or figures. The same may be said of another very powerful and common factor, *viz.*, the timidity of these patients, who would not in a very large number of instances, endure a prolonged and painful course of probe-treatment.

NOTE 2.—It is obvious that several of the above indications co-existed in many cases. It has not seemed worth while to carry the analysis farther.

(9) Duration of operation—

Longest time taken over one operation (one of the earliest cases)	...	50 minutes.
Shortest time taken over one operation		4·5 „
Average time per operation, taken on the 310 operations ...	...	12 „
Average time per operation taken on the last 150 operations ...	...	9·5 „

(10) Names of officers by whom the operations were performed—

By Major R. H. Elliot ...	...	284 operations.
By Major T. H Foulkes	...	9 „
By Captain H. Kirkpatrick	...	13 „
By Lieut. Heffernan ...	...	4 „
TOTAL	...	310 „

In the following tables, only the last 150 operations are considered, as owing to a more elaborate and systematic system of note-taking, the notes in these cases are full in every detail, whereas in the earlier 160 there are omissions

here and there, which would render a constant change of totals necessary, and so complicate the calculations—

(1) The fascia, which closes in the lachrymal groove, was a dense definite membrane, and could be recognised as such in	118	operations,	78·6
The above fascia was so thin as to be unrecognisable or nearly so in	16	,,	10·6%
The parts were so matted that no definite structures could be separately recognised in ...	16	,,	10·6%
TOTAL ...	150	,,	10·0%
(2) The sac bulged into the wound and could be at once recognised on the completion of the skin incision in ...	53	cases or	35·3%
The sac did not so present in	97	,,	,, 64·6%

N. B.—The contents of the sac were always carefully expressed before operation, to avoid leakage of the contents into the wound. Had this not been done, the sacs would have been distended, and a larger proportion would have presented in the wound; this would have made the operation easier, but less safe.

(3) The sac was thick-walled in	116	instances or	77·3%
It was average or thin-walled in	34	,,	,, 22·6%
The sac was adherent to the surrounding parts in ...	137	,,	,, 91·3%
The sac was free from adhesions in ...	13	,,	,, 8·6%
The sac was dilated in ...	75	,,	,, 50 %
The sac was not markedly dilated in ...	37	,,	,, 24·6%

The sac was distinctly contracted in ...	38 instances or	25·3%
(4) The number of sacs removed entire was	107 „	71·3%
The number of sacs removed in pieces was ...	43 „	28·6%
(5) The number of cases in which the nasal duct was patent was...	108 „	72 %
The number of cases in which the nasal duct occluded was	42 „	28 %
The number of cases in which the lower end of the sac was patent was	99 „	66 %
The number of cases in which the lower end of the sac did not appear to be patent was ...	51 „	34 %
(6) The number of cases in which the nasal duct was alone cauterised was	76 „	50·6%
The nasal duct and the dome of the wound were both cauterised in	73 „	48·6%
The number of cases in which the dome of the wound was alone cauterised was	1 „	0·6%
(7) The number of cases in which the adjacent bone was healthy was	80 „	53·3%
The number of cases in which the adjacent bone was carious was	70 „	46·6%
(8) Number of wounds which healed by first intention ..	146 or	97·33%
Number of wounds in which primary union failed or in which the wound subsequently broke down	45 „	2·66%

Some notes of these four cases are of interest. The numbers prefixed to each are the serial numbers of the cases.

No. 228. Hindu female, *æt.* 5 years; trouble began soon after birth; sac greatly dilated and distended with pus (maximum diameter of sac 20 mm.); it had burrowed out a large cavity in surrounding bone at the expense of nasal duct,

which was very short in consequence; some thin pus expressed on seventh day; wound soundly healed on ninth day, and remained so; heard of three and half months after operation, well and immensely improved by operation.

No. 279. Hindu female, *æt.* 10; alleged duration of obstruction one month; lachrymal abscess formed ten days before admission; it was at once incised; sac was removed five days later, as the patient would not stop long in hospital; section healed at once, and she was discharged healed on 19th day; she returned 23 days later with a fistula in usual position, which was freely curetted, bringing away a quantity of rough bone; wound plugged with lint; discharged soundly healed 13 days after second operation.

No. 281. Hindu female, *æt.* 14; duration given nine months; abscess of sac three months ago, succeeded by fistula which was seen on admission; operation difficult due to dense matting of parts, close adhesions to surrounding tissues, and free hæmorrhage; discharge purulent before operation; deep retention of pus; incision down to bone thrice made, and wound scraped each time; the third time a quantity of carious bone was removed; patient discharged soundly healed 51 days after operation.

No. 298. Hindu male, *æt.* 60; duration one year, contents of sac mucoid; operation rapid (eight minutes duration), and uneventful; some secretion retained in wound on seventh and ninth days, soundly healed on twelfth day.

(1) 75% of these cases occurred in children; whereas of the total number of cases under review, only 8·51% were below 20 years of age. Possibly the children were more prone to interfere with their dressings.

The following table serves to show the various factors which would appear to have contributed to the delay in healing. Footnotes are appended to draw attention to the leading points.

Serial No.	Age of patient.	Duration of obstruction.	Was sac dilated?	Were sac contents purulent?	Had there been phlegmonous inflammation before operation?	Was a fistula present at time of operation?	Was 'matting' of parts present at operation?	Wound healed and subsequently broke down again.	Day of final healing of wound.	Dome removed before wound healed.
228	5	5	Greatly so.	Yes.	No.	No.	No.	No.	9th	No.
279	10	$\frac{1}{12}$ (!!)	Yes.	Yes.	Yes.	Yes.	Yes.	Yes. (Broke down on 20th day.)	55th	Yes.
281	14	$\frac{9}{12}$	No.	Yes.	Yes.	Yes.	Yes.	No.	51st	Yes.
298	60	1	No.	No.	No.	No.	No.	No.	12th	No.

(2) In two cases the sac was dilated (50%).

(3) The sac contents were purulent in three cases (75%).

(4) There had been previous lachrymal abscess in two cases, and there was a fistula at the time of operation in both (50%).

(5) In two cases the wound failed to heal till past the 50th day, and in both of these, healing took place as soon as some spicules of bone had been expelled (50%).

(6) The other two cases healed on the ninth and twelfth days respectively. The latter is the only case in which no definite factor obstructing healing can be traced, but the patient's age (60) may be borne in mind.

(9) Latterly a strong effort has been made to follow up the after-course of these cases; it is therefore possible to give more accurate figures for the last 150 than for the earlier ones. They are as follows:—

Number of instances in which patients have been heard of doing well, and pleased with the results of operation, after an average period of three months	53 or	35·33%
Patient did well for four months, and then got panophthalmitis ...	1 or	0·66%
Number of instances in which patients had been heard of, after an average period of 2½ months, stating that the operation had not relieved the watering and other symptoms (none came back to hospital, though all were asked by letter to do so)	9 or	6·00%
Number of instances in which operation failed due to unarrested progress of the septic ulcer which co-existed ...	1 or	0·66%
Number of instances in which the result of the operation has not been traced, in spite of every effort; all the patients were doing well when last seen or discharged from the hospital ...	86 or	57·33%
TOTAL ...	150 or	100·00%

N.B.—It should not be forgotton that, even when some watering and lachrymation continue, in spite of the removal of the original source of irritation (the inflamed sac), the patient has been rid of two serious dangers, *viz.*, (1) the infection of any trifling injury of the cornea with septic matter from the inflamed sac, and (2) the onset of attacks of phlegmonous inflammation of the face.

In this connection, the following facts are of interest, total number of septic ulcers of cornea admitted to the Government Ophthalmic Hospital, Madras, from January 1st to September 30th, 1907, was 118—

Of these the number complicated with acute inflammation of the conjunctiva was	55 or	46·6%
The number complicated with lachrymal mischief was	17 or	14·4%
The number in which a definite cause for the septic condition of the ulcer could not be assigned was ...	46 or	38·9%
TOTAL ...	118 or	99·9%

The bacteriological aspect of this question can not be dealt with in the present paper; but will be taken up later.

It is not possible in the present paper to enter into the very interesting questions of the pathology and etiology of lachrymal obstruction and of dacruo-cystitis in India. The large number of cases which present themselves at this hospital suggest that there must be a very prevalent 'first cause' at work. It is easy to trace the histories from lachrymal obstruction, through retention of secretion, and dacruo-cystitis to phlegmon on the one hand and to septic ulcer of the cornea on the other; but the initial stage is much harder to correctly understand. The

writer is not at present in a position to discuss this very important matter, but certain facts have come to light, which are not without interest, and which it is hoped may be dealt at length later. A large number of sacs have been sent home to Mr. George Coats, the Pathologist of the Royal London Ophthalmic Hospital, who has most kindly examined them, and who will, it is hoped, later on be able to go into the subject thoroughly. From his examination, two facts have stood out so far: (1) that tubercle is not responsible for these cases, for in no single case has he found evidence thereof, and (2) that in a number of the specimens the sac-lining showed well-formed follicles. When one takes into account the great prevalence of trachoma in this part of India, and the frequency with which one meets with follicular enlargements connected with inflammation of the post-nasal mucous membrane in patients here, it seems not at all unlikely that this may be the key to the prevalence of lachrymal trouble in the south of India at least. However, the matter is still *sub judice*. In this connection it is of interest that Basso, who likewise works in a country where trachoma is rife, has found abundant evidence of trachoma of the lachrymal passages in the sacs, he has excised for "rebellious" cases of obstruction. (The part played by trachoma in the pathology of the lachrymal passages, by D. Basso Annali di Ottalmologia, XXXV, 1906, fasc. 7-9). Hertel had noticed the existence of lymph-follicles in the removed sacs of certain cases of lachrymal obstruction as far back as 1899 (*vide* Graefe's Archives, Bd. 48, 1899). On the other hand, Tooke of Montreal was unable to find evidence of follicular formation in his Canadian cases (vide *B. M. J.*, Dec. 22nd, 1906, p. 1814).

One is still frequently asked by visiting surgeons, what becomes of the excessive lachrymal secretion, after removal of the sac. No opportunity has presented itself of actually examining a lachrymal gland subsequent to an operation. But it is to be remembered that in most of these cases there is no clear passage even before the sac and duct are removed. It is also to be borne in mind that the nervous supply of the gland, of the passages, and of the intermediate irrigated region (the cornea and conjunctiva) is from one and the same source; it is therefore only natural that if we remove a source of constant irritation in the shape of the inflamed passages, we rid the whole lachrymal system of the previously existing irritation and excitation. Whether this explanation be right or wrong, one thing at least is certain, *viz.*, that the extirpation of the sac is practically invariably followed by an immediate diminution of lachrymal secretion; in a large number of cases, as has been seen, this happy result appears to be permanent.

P.S.—I must acknowledge the valuable help given me by Hospital Assistant Mr. E. Iyer in tabulating my Notes.—R. H. E.