in this way. Its advantages, according to West, are as follows:

1. The physiological function of the path for tears is again restored, so that not only a suppuration of the sac, a lacrymal fistula, or a phlegmon is healed, but also the tears flow normally through the nose. A later epiphora is accordingly avoided.
2. A so-called cure by probing is rendered unnecessary.
3. The lacrymal gland is spared.
4. A skin incision or curetting from without with eventual scar formation is avoided.

Looking briefly at the anatomy of the lacrymal apparatus, we find a punctum at the inner angle of the upper and lower eyelids, each opening into a canaliculus; these unite and enter the lacrymal sac at about the middle of its orbital or external wall. The sac terminates below in the nasal duct, which runs downwards and opens by a valve-like opening below the anterior part of the inferior turbinate. The sac lies in the lacrymal groove and is separated from the interior of the nose by the nasal mucous membrane and the posterior part of the ascending process of the superior maxilla anteriorly and the lacrymal bone posteriorly. Occasionally a forward ethmoid cell is found over the sac, the position of which is just in front of the middle turbinate bone. The duct does not always run in a straight line down from the sac, but may bend at an angle, and in such cases probing is more likely to do harm than good.

I have operated on sixteen patients, in four of whom it was necessary to open both sacs, so that the series comprises twenty operations. These have been cases of epiphora, of mucocele of the sac, and of suppuration of the sac with and without fistula and phlegmon. The operation performed has been that advised by West with slight modifications of no importance.

The sac is washed out and a few drops of cocaine injected. The nose is packed twenty to thirty minutes before the operation with ribbon gauze wrung out of 20 per cent. cocaine and 10 per cent. resorcin. The position of the sac is first measured off outside the nose, and then marked on the mucous membrane if there is any difficulty in locating it without doing this. It is only in narrow noses that this difficulty arises. A very full curved incision is then made down to the bone, and the flap reflected backwards and most of it removed. The bone is then removed in thin layers; this is the most difficult part of the operation, as there is a great tendency for the chisel or gouge to slip. If one attempts to remove large pieces of bone at a time there is danger of considerable splintering of the ascending process of the superior maxilla, causing unnecessary trauma and increase of granulation tissue, the consequent narrowing of the opening being the cause of a disappointing result. Sometimes, owing to the shape of the ascending process, a very considerable thickness of the bone has to be removed. In all cases the opening in the bone should be made as large as possible, not only from above downwards but from before backwards. When sufficient of the ascending process of the superior maxilla has been removed the opening can be enlarged by Killian-Grunwald and Watson-Williams punch forceps. A fine probe passed through the lower canaliculus will push the sac wall through the opening like a tent. It can then be caught with a fine hook and a large piece cut out of its wall or caught with punch forceps and an opening punched out. The opening can then be enlarged with punch forceps till the probe will pass horizontally into the nose and freely in all directions. The base of the flap which was resected is then turned over the posterior edge of the opening. This portion of the flap has not been kept in all cases and its retention does not appear to be a matter of importance. The sac is washed out daily for a few days, the nose douched, and granulations destroyed if they tend to become large. If the operation is successful, discharge from the punctum and lacrymation ceases, and in twenty-four hours the inner angle of the eye only shows normal moisture. If the result is not going to be good, in some cases there will be a gathering of tears at this point, although the passage is free to the probe and the flow of lotion.

I have only been able to trace the result in fifteen operations. Of these, twelve say that they are completely cured and have no epiphora. One case of double suppuration with fistula has written saying that she still has discharge

and epiphora, but has not had any "abscesses," and one has epiphora. The latter case has been seen, and passing a probe shows the opening to have closed. This sometimes happens (it has occurred in two of the twelve cases who are free from symptoms) and the opening has to be remade. One woman, not included in the above number, when seen about three months ago, said that if she went out in the morning she had epiphora, which stopped when she went home and did not recur if she went out again. This seems to be rather strange, but she held to the statement as being correct. Of the other cases nothing is known, but one had a second operation owing to recurrent suppuration four to five months after the first operation. She left hospital apparently cured, but the final result is not known.

In all the cases in which a fistula was present it healed rapidly. I have never operated on a case during an acute attack of inflammation, but have done so when the symptoms were subsiding. The operation is not difficult; in a few cases it is necessary to remove the anterior end of the middle turbinate or to correct a septal deviation before the area of operation can be reached.

Failure may occur, owing to the opening not being sufficiently large in all directions in the first place, or to free granulations springing up which cannot be kept down, and all surgeons have had cases in which the opening had to be remade. After the second operation the granulations do not appear to be so vigorous. According to Frieburg the canaliculi can normally force tears along to the sac, functioning like a regularly working pump. If this power is lost lacrymation will continue, and amongst the reasons given for this loss of function are: (a) long or improper slitting of the canaliculus; (b) long-continued probing or the use of too large probes; (c) cicatricial alterations of the surrounding soft parts causing impairment of the muscular apparatus.

Statistics vary; I have been able to collect the following list showing the percentage of successes of various operators:

West	...	...	...	...	90 per cent.
Frieburg	...	...	...	...	71 "
Polyak	...	...	...	...	85 "
Fraser (in 50 cases)	...	...	...	...	72 "
Knutson—					
In simple cases	...	...	...	...	89.2 "
In cases of phlegmon and those with					
cicatrices and fistula	...	...	...	...	60.11 "

The operation offers considerable advantages over excision of the sac, but the question whether it is safe subsequently to perform an operation for cataract or one involving the opening of the eye is open to doubt, as some infection of the sac persists after the operation in some cases.

LYMPHATICOSTOMY IN PERITONITIS.

BY

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To Costain¹ we are indebted for the suggestion that opening and draining the thoracic duct may assist surgical measures in serious cases of general peritonitis. He assumed that the chief cause of toxæmia in peritonitis was the flow of toxic lymph into the left subclavian vein, and went far to prove this in dogs suffering from gangrenous appendicitis by diverting this stream to the surface of the neck. He published a successful case of lymphaticostomy in a girl with pneumococcal peritonitis.

In the following case recovery ensued after lymphaticostomy in an attack of peritonitis which was apparently hopeless. Opinions naturally differ as to what is hopeless, but experience has led me to consider that the type in question has a mortality of over 90 per cent. I may add that I look on the ordinary severe appendicitis, with considerable pus in the lower abdomen, with reasonable optimism, and leave the case reported here to speak for itself.

An agricultural labourer, aged 48, was admitted to Addenbrooke's Hospital on April 15th, 1924, with a history that on April 13th he awoke at 2 a.m. with severe abdominal pain. In spite of that he got up and milked the cows. His bowels acted, but he became progressively worse, with pain and vomiting on April 14th, and was admitted to hospital on the afternoon of

April 15th. At this time there was considerable distension of the abdomen; restricted respiratory movements, especially in the lower abdomen; surface hyperaesthesia in the left iliac region, and deep tenderness across the whole lower abdomen. Per rectum there was tenderness and a tense feeling in the pre-rectal pouch. Pulse 88, regular, temperature subnormal; tongue dry. A large faecal vomit occurred just before I examined him. Unable to make any diagnosis other than "acute abdomen," I opened in the middle line and inspected numerous coils of small intestine, all of which were acutely inflamed, distended, and deep scarlet in colour, with occasional slight smears of pus. The appendix was perforated; around it there were no local conditions other than those general to the middle and lower abdomen. The appendix was removed and the wound closed without drainage, the severe distension causing the usual difficulties in such cases of abdominal wall closure. Having decided that this was a case where recovery by the usual methods of after-treatment was almost out of the question, I proceeded to perform Costain's lymphaticostomy.

I exposed the junction of the internal jugular with the left sub-clavian vein, and identified the thoracic duct by its position and by seeing it fill with beads of brilliant clear yellow fluid resembling thin honey drained from the comb. The duct was ligatured off from the vein, slit up, and stitched to the skin; the wound was left open and lightly filled with gauze. A culture from this lymph was proved next day to be sterile.

On April 16th the patient was progressively more ill; he was semiconscious at 10 a.m.; pulse irregular and feeble. There was only a small exudation from the wound in the neck. Abdomen still distended. At 11 p.m. he was still semiconscious, could just be roused; chyle was discharging more freely from the neck. Respirations 28, pulse 128. The next day he was fully conscious, the pulse had improved, though the abdomen was still distended. Chyle was pouring freely from the neck.

On April 19th the distension was decreasing; good result at last after numerous enemata and six doses of pituitrin at intervals. The neck was still discharging freely. Pulse good.

On April 23rd the distension had gone. There was discharge of pus from the abdominal wound and sudden diminution of chyle from the neck. By April 26th the neck was practically dry; the bowels acted daily. Since April 17th the temperature had never been above 98.8°.

The patient was discharged from hospital on May 10th with both wounds healed and normally convalescent.

Two points appear to me to call for comment:

1. The thoracic duct is not very easy to find. I had practised several times on the cadaver, and consider it a difficult minor operation, because the duct is delicate in texture and thinner than one expects. After the exposure by dissection one is glad to have confirmation in the living subject by the presence of beads of lymph. In this case the beads were honey yellow at the time of operation; two days later the discharge had the usual appearance of thin dirty milk.

2. The paucity of lymph in the first twenty-four hours in this case is explained by the fact that this man was depleted of fluid by starvation and by a large faecal vomit; it was only after continuous rectal saline for twenty-four hours that lymph began to flow freely. No measures were taken to stop the flow of lymph, and this subsided in a week; Costain states that the lymphatics on the right side restore the circulation.

REFERENCE.

¹ Canadian Med. Assoc. Journ., November, 1922. *Surgery, Gynecology and Obstetrics*, March, 1923, p. 365. *Medical Annual*, 1924, p. 9, abstract by Dr. E. Wyllys Andrews.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SOME INDICATIONS FOR TUBERCULIN THERAPY.

TUBERCULIN in certain cases appears to act like a charm, in others to do little or no good, and in others again to do actual harm.

I have under review 96 afebrile patients treated with tuberculin, all of whom showed a considerable degree of ill health. Before treatment each case was tested by the modified von Pirquet test of Ellis, in which the dilutions used are 1 in 500, 1 in 100, and 1 in 10 of tuberculin. Those who react to 1 in 500 are called "hypersensitive," those to 1 in 100 "sensitive," and those to 1 in 10 "sub-sensitive."

For a time I was puzzled as to what factor influenced the results. I tried grouping the cases according to physical signs, degrees of sensitiveness to tuberculin, and so on, but the exceptions in each class were many. I then hit on the expedient of dividing the cases under headings of "effect of treatment," grouping the cases as "good," "fair," and "no change." By "good" I mean those which were to all intents and purposes in good health at the end of the

course; by "fair" I signify improvement. I found that by this method under the heading "good" were included all children and adults with low blood pressures (tubercle bacilli negative in both classes). The remainder of the cases came under the headings of "fair" or "no change."

I then found that the low blood pressure cases (tubercle bacilli negative) were either hypersensitive or sensitive to tuberculin and that the high blood pressure cases were less sensitive. I could come to no definite conclusion about the tubercle bacilli positive cases, so I put them into a separate class. My results finally worked out as below.

A. Sputum negative to tubercle bacilli.

1. Children under 14: 16 cases—100 per cent. "good."

2. Adults—

(a) Blood pressure 120 or under: 37 cases—100 per cent. "good"; these were all sensitive or hypersensitive.

(b) Blood pressure 130 and over: (1) Sensitive: 13 cases—100 per cent. "fair." (2) Sub-sensitive: 14 cases—28 per cent. "good" (all asthmatics); remainder unchanged.

B. Sputum positive to tubercle bacilli: 16 cases—50 per cent. "fair"; none good.

It became evident that blood pressure was an important factor, and it seemed probable that the degree of fibrosis in the lung would influence this. In order to ascertain if this were so, I examined a series of hospital records with special reference to the amount of fibrosis indicated by x-ray photographs, and classified them as above.

A. Sputum negative to tubercle bacilli.

1. Children under 14: 14 cases—beyond some enlarged hilus glands very little change.

2. Adults—

(a) Blood pressure 120 and under: 20 cases—very slight fibrosis in all except 2 in which it was marked.

(b) Blood pressure 130 or over: 48 cases—all had marked fibrosis except 10.

B. Sputum positive to tubercle bacilli: 22 cases—in every case there was marked fibrosis.

Conclusions.

1. Fibrosis is an important element in tuberculin therapy, and, other things being equal, the less fibrosis there be the more satisfactory the results with tuberculin.

2. Hypersensitiveness is no contraindication to tuberculin therapy.

3. In subsensitive cases much improvement with tuberculin cannot be expected save in cases of asthma.

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HYDRONEPHROSIS WITH DOUBLE URETERS.

THE following condition is interesting on account of the combination of hydronephrosis with a calculus impacted in the ureter, and with the presence of two ureters from each kidney.

A man, aged 75, was admitted to the Northumberland Mental Hospital on February 14th, 1924, suffering from senile dementia; he died on February 26th. There was a history of an illness twelve years before, supposed to be renal in origin, but no details could be obtained.

At the necropsy the following unusual condition was found. The right kidney weighed 4 oz. and had a small cyst at the upper end. Emerging from the lower end was a second ureter, which passed side by side with the normal ureter to the bladder. Both contained urine and appeared to have functioned. The left kidney when emptied weighed 1 oz. and showed merely a thin shell of kidney tissue, filled with clear urine. As in the right kidney a second ureter emerged from the lower end of the kidney. These two ureters passed downwards and united 3 inches from the bladder. Just below the junction a calculus with a rough surface and as large as a good-sized hazel-nut was impacted, completely blocking the ureter.

Morpeth.

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