covered with flannel and permitted to remain until it is thoroughly warmed up. The recumbent posture forced on the patient by this treatment is at least one of the reasons for its success.

An antispasmodic regimen should not be overlooked in cases of obstinate emesis. Attention has already been called to its value in the treatment of seasickness, and also to its use in connection with morphin in the treatment of gallstone or renal colic. Obviously, the greater the importance of spasm in the emesis, the more important is atropin therapy. Thus, in pylorospasm, it is the most important means of medicinal treatment. As this condition occurs chiefly in children, it must be borne in mind that these bear much larger doses of atropin than that arrived at by applying the classical dose rules. Enough should be given either to control the symptoms or to produce undesirable side-effects, such as marked flushing of the skin or dryness of the mouth. As aqueous solutions rapidly deteriorate, it is best to dissolve a 1 mg. tablet of atropin sulphate in 1 c.c. of water and to start with 1 drop of this solution before each feeding. In the milder cases, the dose may be given in the bottle of artificially fed infants, or, if the child is breast fed, in a teaspoonful of water before nursing. In severe cases, the drug should be administered hypodermically. Should 1 drop fail to relieve, the dose is increased progressively to 2, 3 or more drops. Haas [4] reports his experience with more than forty cases of pylorospasm, in nearly all of which this treatment was successful. The largest dose employed was a little less than 1 mg. at each feeding, or 8 mg. in the twenty-four hours. Such treatment may be required for only a few weeks or for the greater part of the first year. When constipation with rectal tenesmus occurs during the course of this treatment, the omission of a few doses of atropin usually relieves this.

An interesting controversy regarding the effect of atropin on gastric motility, as observed roentgenoscopically, has arisen between Lasch [5] and Oetvös,[6] due, as will be noted, to difference in dosage occasioned by difference in mode of administration. Lasch gives from 1 to 1.5 mg. of atropin intravenously, while the patient is being observed with the fluoroscope, and reports—after a transient increase in peristaltic action in some cases—the regular and definite lessening of tone and of the peristalsis in cases of hypertonus and hyperperistalsis, while normal or deficient tonus or peristalsis is not influenced. Oetvös, on the other hand, finds that 1 mg. of atropin solution injected subcutaneously causes pylorospasm in patients with deep ulcer in the vicinity of the pylorus so regularly that he proposes this as a test for deep pyloric or duodenal ulcer, as such an effect is not obtained when the ganglion cells in Auerbach's plexus are not affected by deeply extending disease. These studies obviously point to the practical fact that we must not hesitate to push the dose to the physiologic limit, as a large dose may succeed when a small dose fails; and they also prepare us to understand why atropin may fail as an antispasmodic in certain cases of peptic ulcer.

4. Haas, S. V.: Congenital Hypertrophic Pyloric Stenosis and Its Treatment by Atropin, J. A. M. A. **79**: 1314 (Oct. 14) 1922.
5. Lasch, C. H.: Röntgenologische Untersuchungen über den Einfluss des Atropins auf die Magenmotilität, Klin. Wchnschr. **1**: 840 (April 22) 1922.
6. Oetvös, Erwin: Röntgenologische Untersuchungen über den Einfluss des Atropins auf die Magenmotilität, Klin. Wchnschr. **1**: 362 (Feb. 18) 1922; **1**: 1209 (June 10) 1922.

THE TREATMENT OF CONGENITAL DACRYOCYSTITIS *

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The term "congenital dacryocystitis" is a misnomer. The condition develops after birth, and not before, and is not a true inflammation of the sac wall, but an infection of the retained excretions from the conjunctival sac. The condition that predisposes to this postnatal infection, however, is congenital in the sense that there has been a delay in Nature's process of canalization of the lacrimal passageways. This is manifest in at least 95 per cent. of all cases by delayed opening into the inferior nasal wall.

We are indebted to Born, Legal, Kolliker, Ewetzky, Schaeffer and others for our knowledge concerning the embryologic development of the nasolacrimal passageways; but to Schaeffer, perhaps, belongs the credit of a more thorough study of the subject in the human embryo, commencing when the initial cells are laid down and continuing the study until it is complete at the end of gestation. From his investigations, we learn that this development begins at about the end of the fifth week, in the naso-optic groove, by a process of proliferation, and continues until the cells are finally submerged in the mesenchymal tissues by a gradual closure and obliteration of the groove or fissure. These epidermal cells now become a detached cord, having no communication with the surface at either extremity. By a process of "budding," the ends of this cord find their way to the surface epithelium again, the superior end forming the dome of the sac and canaliculi, the lower end terminating in the inferior nasal meatus. As this development progresses, there is, at the same time, a rearrangement of the cells so that distinct walls are formed; the lumen of the passageways become manifest, and the innermost cells become necrotic and ready for expulsion as soon as the passage is opened, which usually occurs at, or before, birth. The nasal opening is the last to form; in a great many instances it is impervious at birth, but canalization may continue until the nasal mucosa is reached, or until the retained secretions, with the aid of the muscular action of the lids, cause the thin partition wall to rupture.

It is this delayed opening of the nasal end of the duct with which we are chiefly concerned in the treatment of congenital dacryocystitis. It is a well known fact that a great many cases of this nature recover spontaneously. Cases in which there has been a persistent epiphora for several weeks or months after birth, followed by cessation, are undoubtedly due to Nature's completion of the process of canalization.

But the cases with which the ophthalmic surgeon has to contend are those in which no such favorable termination is achieved. Relief is sought for a purulent discharge from the eye, which was preceded by a persistent overflow of tears. There is usually no history of pain, redness or swelling, either of the lids or of the conjunctiva. The sac wall may appear distended when the purulent fluid has been allowed to accumulate, but there is no real inflammatory infiltration unless the infection has persisted for a long time. The lacrimal sac has simply become a culture tube, and the fluid mixed with retained necrotic débris, a favorable culture

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medium. As soon as proper drainage is established, recovery is prompt and complete.

At the St. Louis session of the American Medical Association, May, 1922, there was a discussion before the Section on Ophthalmology on the use and abuse of the probe in the treatment of dacryocystitis in general. In discussing the congenital type, no reference was made to a method of treatment that has been successful in my hands for the last seven years, during which time I have never found it necessary to resort to the use of the probe.

The treatment is simplicity itself. A few others have practiced it in the past, but it has never been put before the profession in such a way as to cause its adoption in preference to the more difficult and painful method of probing. It is conceded, of course, that one successful passage of a medium size probe usually suffices to cure the condition (and, in rare instances, may have to be done), but an anesthetic is usually required to avoid the danger of unnecessary traumatism, and even then there is the danger of forcing a false passage into the nose or its adjacent tissues, to say nothing of the dangers from the anesthetic.

METHOD OF PROCEDURE

1. The tear sac is allowed to become fully distended. We caution the mother not to wipe the eye or in any way to press on the tear sac before coming to the clinic or office. She is given a 25 per cent. solution of protargin mild (argyrol) or other antiseptic eye lotion, to be dropped into the culdesac three times a day, to protect the eyeball from infection.

2. The infant's head is held between the surgeon's knees in a manner similar to the method in vogue of inspecting the eyeball. Assuming that it is the right sac that is affected, he places his right thumb over the sac in a way to shut off the return flow through the puncta. This is done by holding the thumb sidewise, with the thumb nail outward and forming an acute angle with the plane of the iris. The edge of the thumb is now pressed downward over the puncta, compressing it against the rim of the orbit; with this point of pressure maintained, the thumb is rotated to the right, at the same time pressing downward, abruptly, over the sac. The fluid, now being compressed by the thumb, transmits the pressure to the walls of the sac, which must give way at its weakest point, which happens to be the site of the nasal opening. Repeated cures after one manipulation of this sort, and no failures so far, extending over a period of seven years, convince me that the probe should never be resorted to except as a last resort.

The salient points to be remembered are: (1) Pressure must be made over the sac only when it is distended; (2) care should be taken that the thumb is applied in such a way as to prevent regurgitation into the conjunctival sac, and (3) sudden pressure over the sac causes the retained fluid to burst through the persistent fetal membrane which separates the mucous lining of the nose from that of the nasal duct.

COMMENT

On reviewing the literature of this subject further, we find little or no stress laid on this particular mode of treatment. The late Dr. Kipp, however, was a strong advocate of it. In the discussion of a paper on this subject by Dr. William Zentmayer, in 1908, he said:

> In all cases treated within the last ten years, I have used simply cleansing and pressure, and have not had to use a probe in any case. The cases that come with abscesses of the lacrimal sac are those that have been probed by other oculists. Cases that come to me within a couple of weeks after birth are cured in a very short time by simple cleansing and pressure. You must instruct the nurse or mother to exert pressure properly to direct the secretions downward. If you do it yourself, you can often feel the obstruction give way.

Fuchs, in the last edition of his textbook, dismisses the subject with the following remarks: "Usually repeated expressions of the lacrimal sac suffice to cure the disease; if not, we must make the nasal duct pervious by the use of sounds."

Roemer says that we need only to teach the mother to press the contents of the sac out regularly (meaning into the conjunctival sac), and the passage into the nose will open spontaneously. If the suppuration should not disappear in a few days, the stenosis may be easily removed by the careful passage of a probe.

Crawford makes use of pressure applied over the sac, and repeats this several times a day as an adjunct to other remedies.

Fage recommends expression, probing and incision if necessary.

Norris and Oliver [1] advise expression, and, in the event of failure, four or five probings with gradually increasing sizes.

Zentmayer is a strong advocate of the probe, while Jackson states that he avoids the use of the probe whenever possible, and relies on gentle pressure. When necessary to resort to the probe, he prefers one of moderate size, for, he says that this is not wholly without risk even in skilful hands, but the risk from attempting to force a passage with fluid from a syringe is at least as great.

The foregoing method, of course, is based on the assumption that we are always dealing with an imperforation at the nasal end of the duct. If the obstruction is due to a diverticulum or fold of mucous membrane, congenital stricture or bands in any portion of the canal, such treatment is of no avail, and, for that matter, probing would not suffice. On the contrary, it might do more harm than good. Such conditions are extremely rare, and treatment by any method other than extirpation of the sac is unsatisfactory.

The simplicity and efficacy of the treatment here described should appeal to the pediatrician, the obstetrician, and to the general practitioner as well, to whom these cases are first brought. If they will recognize the condition before infection has taken place, and will practice the procedure described above when the sac is distended with lacrimal secretion, and not with pus, they will relieve many a fond mother's anxiety by promptly curing the condition.

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1. Norris and Oliver: Diseases of the Eye, Philadelphia, J. B. Lippincott Company, 1907.

Diphtheria Immunization of School Children.—The *Monthly Bulletin* of the department of health for April contained a report of the work of the bureau of laboratories, which shows that in 1922 more than 157,000 persons, chiefly school children, have been Schick tested and immunized, when necessary. This year's work has extended the number of protected school children in Greater New York to more than 250,000. Deaths from diphtheria continue to decline. The report announces that a modified Schick outfit has been devised which will be placed on the market within the next month, and eliminate the difficulties of the old capillary tubes due to breaking up of the column of toxin. Occasionally some of the toxin entered the closed ends of the tube, making the outfit useless. During the year the laboratory produced 1,411,300 c.c. of diphtheria toxin and 1,993,100 c.c. of diphtheria antitoxin. The value of the antitoxin was $135,245.80.