an important anomaly which predisposes to the persistence of chronic inflammation.

Irregularities of the septum may play a morbid role even without reducing the capacity of the nasal passage. An irregular septal surface favors chronic inflammation, perhaps by impeding the flow of morbid secretions. Hence, successful operations of septal deformities often prove of service even where no stenosis existed. They are not rarely the starting point of morbid reflexes, especially when the spurs are sharp, or when they come in contact with the surface of the turbinals.

For these various reasons operative treatment of septal deformities is often indicated and in the case of extensive malformation it is usually satisfactory. But the minor irregularities, and especially the deformities due to moderate septal deviation, are not so easily benefited mechanically. The novice can not be too strongly warned against attempting operations indiscriminately, as many of these fail primarily for mechanical reasons, or produce but a temporary result on account of relapses.

INJURY OF THE CAVUM PHARYNGEUM; REPORT OF A CASE.

BY EMIL ARONSON, M.D.

DALLAS, TEXAS.

Several years ago, while practicing in Europe I received a call to Mr. D., a gamekeeper, who had sustained an injury from the explosion of a gun. In the morning Mr. D. had tried his first experiment with his new gun. While the members of his family were looking on they saw him fall to the ground with blood oozing from nose and ear. He was carried unconscious into the house. After some time he regained consciousness but did not complain of the presence of a foreign body in his throat, yet his family thought it necessary to send for their family physician. This gentleman arrived, examined the throat and stated that except a piece of a tooth which was lodged in the posterior wall of the pharynx, nothing could be found. Promising to return in a day or two to remove that remnant of the tooth he left the house. Other relatives of the injured man, much surprised at the indifference of this gentleman, decided to send for me.

Inspection reveals the following conditions: Upper lip swollen, upper right incisors are missing; some loose fragments are hanging in the alveoli. The palate, the mucosa buccalis, the tongue, uvula and posterior wall of the pharynx are discolored, powder-stained and covered with coagulated blood; on the right side of the posterior wall in the region of the constrictor pharyngeus superior and medius is a mass of indistinct shape and color.

The gun consists of two long tubes which can be attached to each other. After placing the cartridge in one tube, the other tube is screwed on to it. At the end of this long tube the inventor inserted an iron bolt, he put the tube to his mouth and expected that by very forced expiration the bolt could be driven against the cartridge. His calculation failed to prove correct at the first trial. He did not consider that the moment the bolt and cartridge would meet explosive gases would become free, which, if no valve was provided, would drive the bolt back into the mouth of the experimenter.

Although the patient felt perfectly comfortable and there were no symptoms of stenosis, I managed to

make out a large, smooth, round, metallic body in the back wall of the pharynx. Trying twice, I failed to grasp this with a long forceps, due to the impossibility of pressing the points of the forceps into the hard iron bolt. I then took a long Langenbeck retractor and using it as a lever removed the bolt, which weighed nineteen grams and was four and a half centimeters long.

I prescribed an antiseptic gargle and directed ice and antipyrin for the intense headache, which appeared in the course of the week. In about ten days the patient was well again. A few conclusive remarks about the direction of the projectile: The upper incisors were struck first and knocked out. The projectile then changed its direction and passed through the oral cavity to become imbedded in the muscles of the pharynx, where it lodged on one of the vertebræ. It is remarkable and of value in regard to diagnosis, how very little pain was felt by the patient, who for more than twelve hours did not believe there was a foreign body in his throat. This case shows how valuable an objective examination is and teaches us not to rely entirely upon the patient's statements or upon the observations of Schroetter (notably, on "Diseases of the Ear," 1876 and 1882), who says that in such injuries of the pharynx the patients always claim to feel the foreign body in the throat.

DISEASES OF THE EYE CAUSED BY DISEASES OF THE NOSE.

Read before the Chicago Academy of Medicine, December, 1897.

BY ALLEN T. HAIGHT, M.D.

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There are no organs of the human body more closely connected than the eye and the nose. No organ suffers more from reflexes than the eye from the nose. The slightest offense to the mucous membrane of the nasal chambers will instantly cause suffering to the eye. Let one come in contact with smoke or other irritants to the Schneiderian membrane and the eye will soon respond to its danger and shed tears. The reason for this is clear, as the eye is directly connected with the nose by the nasal duct, the same mucous membrane, histologically connected, continues to cover the eye lids, the globe and the orbits.

The lachrymal artery with its branch, the anterior ethmoid, supplies blood nourishment to both the lachrymal sac and the nasal duct. The nerve supply is received in common from branches of the ophthalmic nerve and Gasserian ganglion. The lachrymal sac, the dilated part of the nasal duct, is situated in a channel of the nasal process of the superior maxillary and lachrymal bones. Its formation is fibrous and elastic, lined with mucous membrane, continuous with that of the nose. The membrane of the lachrymal sac and canaliculi is lined with pavement epithelium, but in the main duct the epithelium is partly of a cylindric variety. The middle lachrymal organ (Fig. 1) consists of a small double puncta, located from six to eight millimeters from the apex of the inner canthal angle, opening into the corresponding superior and inferior canaliculi, which meet toward the inner canthus in the lachrymal sac.

"The lachrymal secretion is forced through the puncta into the canalicula, then enters the sac and

finally, into the nose through the nasal duct by a combination of winking and the suction force of the Horner's muscle, and possibly of the muscular fibers given off from the orbicularis and the tendo oculi. The canaliculi and puncta, therefore, are not merely drains to carry off the lachrymal secretions, but in conjunction with the muscular fibers mentioned act very much as a suction syringe. These canaliculi are not perfectly straight; the mucous membrane lining them is like that of the nose¹."

FIG. 1.—1 and 3, orbital and palpebral portions of lachrymal gland; 2, fibrous band dividing the gland; 4 and 5, orifices and branches of the lachrymal canal; 6, lachrymal sac.

The nasal duct, which is about three-fourths of an inch in length, begins at the somewhat constricted portion of the passage where the sac terminates, and extends in an osseous canal formed by the lachrymal superior maxillary and lachrymal process of the in-

FIG. 2.—1, middle turbinated body turned aside and held by a hook; 2, nasal duct and valves; 3, canal leading to the maxillary and frontal sinuses; 4, inferior turbinated body showing location of the mouth of the nasal duct in the cul-de-sac.

ferior turbinated bone, in a direction differing almost (Fig. 2) in every case that presents itself downward, slightly backward or outward to the inferior meatus of the nose. Hence we have a direct route in the nasal

chambers for the passage of morbid germs from the rhinal cavities to the eye, and under certain pathologic conditions the nose becomes a factor for aggravating causes of ocular disturbances. The ordinary blood supply with anastomosis from the duct and sac, and the connected relation of the accompanying veins manifest that certain mechanical or pathologic conditions existing in the nasal chambers may produce pronounced symptoms in the eye. For example, an irritation of the Schneiderian mucous membrane may produce lachrymation, and more dangerous ocular disturbances often accompany coryza, measles, scarlatina, etc.

"Dr. Edwyn Andrew", M.R.C.S., says that the fluid of the lachrymal apparatus is continuous from the conjunctiva to the nose, and by the apposition of the lids to the eyeball and the attraction of adhesion and cohesion produced, a thin layer of tears is brought into contact with the cilia, and by them conveyed to the puncta, where capillary action of the canaliculi brings them within reach of the cilia and the lachrymal nasal canal, which pass them onward through the sac and nasal duct to the nose. This natural course of the tears is, however, easily changed, the power of the cilia is feeble and soon overcome by any increase or altered condition of the fluid in contact. Extra secretion is so easily excited through irritation of the branches of the fifth nerve, which supply the conjunctiva and lachrymal gland, that the whole lachrymal apparatus quickly becomes engorged with fluid, which if persistent, soon produce morbid changes in the adjoining mucous membrane. The irritation thus produced, which soon causes in the open eye change of the natural secretions to muco-pus or inflammation, ulceration, thickening of lids, inversion and eversion, closure of the puncta, etc., naturally becomes still more injurious to the almost pent up cavity of the lachrymal nasal canal, frequently converting it into an abscess, occluding the channel by exudation and causing stricture of the constricted portions, particularly at the entrance of the canaliculi into the sac, and at the junction of the sac and nasal duct."

Having examined the anatomy and physiology of the parts pertaining to the subject I will now proceed to the historical and pathologic comments of the best ophthalmologists of the present day, in addition to my personal observations. I will attempt to show that the eye specialist can not successfully treat the eye without attending to the nose. Foubert invented the lachrymal canula in 1819, on account of obstruction from polypi of the nose, but nothing can be found as to the results in his case, as very little is known of him.

Dr. J. Reeve, in 1821, in the "London Medical Repository," first called attention to diseases of the eye affected by the nose. In 1859 Chalou³ wrote on adenoiditis lachrymalis, but gave no description of his treatment except that of sounding and the usual eye water. In 1861 von Graefe⁴, in 1862 Carl Schweigger⁵, in 1863 Brueff⁶, in 1864 Minkiewicz⁷, in 1869 Vassoux⁸ and others, only alluded to diseases of the eye caused by diseases of the nasal chambers.

In 1887 Dr. A. Blitz⁹ reported before the Medical

¹ Dr. Casey A. Wood: International Clinics, 1895, p. 318.

² British Medical Journal, Dec. 15, 1883, p. 1185.

³ Medic. Ztg., 1859.

⁴ Archives of Ophthalmology, Berlin, 1861.

⁵ Medic. Ztg., Berlin, 1862.

⁶ Wratsh, 1863.

⁷ Goz. Lek., Berlin, 1864.

⁸ Reprint from Archives d'Ophthal., 1869.

⁹ Transactions Medical Society of Tennessee, 1877.

Society of Tennessee a successful operation of extirpation of hypertrophy of the lachrymal gland extending from the nose, saving the eyeball with complete recovery. In 1878 a wide chasm occurred which can not be overlooked. Wm. Hack of Freiberg, with his renowned monogram, which the world must follow, has shown not only that we have migraine, asthma, hay fever, etc., but that the eye also suffers in consequence of the obstruction of the olfactory canal.

Hack, and many others since his time, have only superficially mentioned the subject until in 1886 Dr. Grenning¹⁰ in an article on "Reflex Ocular Symptoms in Nasal Affections," gave the first elaborate description of ocular symptoms caused by obstruction of the olfactory canal, and points out that photophobia may be readily produced by touching certain parts of the Schneiderian membrane with the sound, and *vice versa*, reflex nasal symptoms, for instance, sneezing may be effected by exposing certain eyes to the bright light. The leading ocular symptoms, which in certain cases depend mainly on the pathologic conditions existing in the nose, are lachrymation, photophobia, conjunctival hyperemia, pericorneal injection, smarting or burning and swelling of the lids, phlyctenular disturbances, epiphora, etc. In addition to the symptoms I have described I recommend as a guide to the ophthalmic practitioner the systemized ocular symptoms, depending upon pathologic conditions of the nose by Dr. Gradle¹¹, which are as follows: "1, lachrymation without primary lesion of the tear passages of the eye and due to some chronic abnormality of the nasal passages; 2, fulness of the lids and itching, possibly with lachrymation and more or less pain, and with asthenopia especially marked in one eye. Patients with these symptoms aggravated have also a refraction or muscular anomaly; 3, periodic discomfort (itching of the lids), allied to hay fever, or coexisting with conjunctival lesions, at first of the follicular enlargement and finally of a formation of large, flat, yellowish follicular granules which disappear in winter; 4, photophobia, with or without pain in the eyes, these being often blood-shot with little nasal annoyance but with decided itching; 5, injection of the pericorneal vessels together with varying degrees of the above symptoms, chronic and persistent; 6, acute congestion of the lids with irritable nose, erysipeloid in character, subject to recurrence, lasting from two to six days; 7, sudden edema of lids without congestion, the attack lasting a few hours."

I shall now confine the principles of the subject to two classes; first, pathologic conditions of the eye depending on hypertrophies, deformities or mechanical abnormalities of the nose; second, pathologic conditions of the eye resulting from the passage of morbid material from the nose through the nasal duct or intermediate tissue of the eye.

One of the frequent causes of ocular disease is chronic hypertrophic rhinitis, especially in that form in which sudden dilatation of the blood vessels of the mucous membrane is apt to recur from very slight irritation. In such cases we have a copious aqueous discharge from the nose with severe inflammation of the inferior turbinated body, especially marked in the anterior half, associated often with mucous polypi in the middle meatus. Eye symptoms occurring with this condition of the nose are lachrymation, photophobia, burning and smarting of the lids with deep injection,

particularly marked at the margin, and not infrequently ciliary and conjunctival injection. Polypi of mucous region situated so as to form a wedge between the septum and inferior turbinal, or situated so as to fill the superior meatus, give rise to persistent ocular lesions; deviated septum, spurs, fissures, post-nasal adenoids and synechia play an important part in the production of sympathetic ocular conditions.

Dr. Charles Michael describes a case of ectropion of both lower lids caused by complete obstruction of the right and left lachrymal passages, which was operated upon by him in a manner not found in the textbooks or reported in literature. He says the patient was 62 years of age. There had been complete obstruction of the passages for periods of ten and twenty-eight years respectively. Dr. Michael received the idea of the operation in Paris in 1859, but did not bring out his method until 1871. For ten years he continued it and was successful in every case. He gave up the old method of introducing a canula, and believed that the only correct method of treatment of obstructed lachrymal passages was to clear the nasal cavity and secure a permanent dilatation between the nares and lachrymal duct, so as to allow a free exit of the secretions coming from the conjunctival surface and lachrymal canal.¹²

Bishop cites a case of amblyopia of the left eye cured by the removal of an osseous synechia between the left turbinated bone and the nasal septum.¹³

Dr. Bettman¹⁴ reported a case of constant epiphora, which he cured by extirpating the hypertrophied tissue of the anterior portion of both turbinated bones.

The six cases reported by Hamilton and quoted by Gould are as follows:

Case 1.—Empyema of the antrum and unilateral hypertrophic rhinitis of the left side attended with the following eye symptoms: 1, concentric contraction of the visual fields for all colors; 2, accommodative asthenopia; 3, retinal hyperesthesia; 4, photophobia with blepharospasm and interorbital neuralgia. The evacuation of the empyema and its cure were speedily followed by the disappearance of the eye symptoms.

Case 2.—Echondrosis of the triangular cartilage and chronic rhinitis. This case was attended with the following eye symptoms: 1, asthenopia; 2, pain in the eyeball; 3, injection of the eyes when used for close work; 4, blepharospasm; 5, contraction of the visual fields. These symptoms disappeared on removal of the growth.

Case 3.—Bony septum causing chorea, the following eye symptoms were present: 1, asthenopia; 2, subjective color sensations; 3, sneezing; 4, contraction of the visual fields. These symptoms disappeared on removal of the spine of the septum.

Case 4.—Advanced chronic atrophic rhinitis with middle turbinate hyperplasia. The following eye symptoms were present: 1, asthenopia; 2, lachrymation; 3, puffiness of the lids; 4, contraction of the visual fields. These symptoms were relieved by the treatment of the nasal condition.

Case 5.—Syphilitic ozena. The following eye symptoms were present: ("Transactions of the Intercollegiate Medical Congress of Australasia," 1889, Vol. ii, p. 779) 1, asthenopia; 2, lachrymation; 3, pericorneal injection on using the eyes; 4, contraction of the visual fields, which was temporarily removed by the use of amyl nitrate. These eye symptoms were ameliorated as the nose improved.

Case 6.—Polypi, nasal and naso-pharyngeal, with eye symptoms similar to those recorded.¹⁵

Polypi or vegetation, either in the superior or anterior nasal cavities, will oftentimes produce that peculiar deformity known as "frog face." When the nose becomes widened between the eyes and they protrude, the lids become granulated and drooped as seen in mouth breathers. Pressure on the upper part of the nasal duct

¹⁰ Archives of Ophthalm., 1886.

¹¹ Archives of Ophthalm., 1887.

¹² St. Louis Courier of Medicine, Vol. vi, p. 80.

¹³ Bishop on Diseases of the Ear, Nose and Throat, p. 284.

¹⁴ Journal American Med. Assn., May 7, 1887.

¹⁵ Burnette: System of Medicine, p. 169.

produces epiphora and sometimes conjunctivitis, which can only be cured by the removal of the obstruction and the restoration of the nose to its normal condition. Catarrhal conjunctivitis I find to be nothing but a reflex from nasal catarrh. Especially if the patient is of a catarrhal diathesis, a mere simple coryza of the nose will produce an inflammation of the mucous membrane of the inner surface of both eyelids, and will be reflected upon the ocular conjunctivæ. Abnormal developments of the ethmoid or sphenoid markedly affect the functions of the ocular muscles or the acuteness of vision. Over-development of the ethmoid, especially in the anterior portion, will sometimes produce complete stenosis of the upper part of the nasal duct, and there is epiphora from pressure; following this we get blennorrhœa of the lachrymal sac and possibly dacryocystitis. Abnormal development of the posterior portion of the ethmoid may produce widening of the inter-orbital space, displacement of the origin of the internal recti muscles, with high degrees of astigmatism and occasional divergent strabismus following. Over-development of the sphenoid may, by pressure of the optic nerve, produce permanent atrophy limitation of the field of vision and partial or complete color blindness. Hypertrophies, polypi or tumors in the superior nasal sinus may produce temporary blindness or high degrees of amblyopia, which are ameliorated or cured by the removal of the obstruction.

Dr. Edward Nettleship¹⁶, F.R.C.S., ophthalmic surgeon St. Thomas Hospital and Royal Ophthalmic Hospital, London, reports a case of a woman 50 years of age, who fell on her head (probably on her face). Vision failed about two days after the injury. She was unable to count her fingers with the right eye. Six days later hemorrhage of the nose set in. In twelve days the vision began to improve rapidly and fully recovered in four weeks.

The eye is rendered liable to infection from disease germs of every description that may find access through the lachrymal channel (Fig. 3), from the nose afflicted with diseases such as ozena, hydrorrhea, atrophic rhinitis, hypertrophic rhinitis with aqueous discharge, gonorrhea, syphilis, diphtheria, measles or scarlatinal deposits, etc. The conjunctiva is a very delicate and sensitive membrane, and easily yields to an attack of morbid germs. These sometimes gain entrance to the eye by direct migration, but are frequently forced into the eye by blowing the nose, sneezing and not infrequently by the use of the Politzer air bag, or by Butler's inhaler. The cul-de-sac of the inferior turbinated body is the receptacle for the collection of material which is, or becomes decomposed, and finds its way or is forced into the lachrymal sac and to the conjunctiva many times followed by blennorrhœa, conjunctivitis, phlyctenular keratitis or ulcer of the cornea, which will not yield to treatment until the origin of the disease in the nasal cavity has been corrected. In specific diseases the lesions of the lachrymal organs including the canalicula, dacryoma in the nasal duct is usually found. Dacryocystalgia and purulent lachrymation may be caused by periostitis of syphilitic origin.

Dr. Bull¹⁷ says, "It is not common to meet with a purulent dacryocystitis, unless there is present disease of the periosteum or endosteum of the nasal duct, or carious disease of the bony canal of the lachrymal

bone. In some cases it is possible that the focus of the disease started in periostitis or endostitis of the nasal duct of constitutional syphilis, and spread to the mucous membrane lining the duct and sac, thus causing the dacryocystitis."

Syphilitic infections in the nose may be hereditary or acquired, yet they do similar mischief, very frequently causing obstruction by incrustations, yet there are other phases of lachrymal inflammation and obstruction, as described by Dr. David Harrower, who says, "obstruction of the duct may come from inflammation of the mucous membrane in the nose, simple chronic catarrh from a scrofulous or syphilitic origin. The swelling of the mucous membrane may extend by continuity to the mucous membrane of the duct. In the ordinary forms of ozena there is no swelling but cicatricial contraction of the nasal mucous membrane, which may lead to the constriction of the inferior orifice of the duct. Ulcers of the mucous membrane and polypi are also causes of obstruction of the nasal ori-

FIG. 3.—1, inferior turbinate bone; 2, nasal duct and valves; 3, middle turbinate body; 4, lachrymal sac; 5, lachrymal canaliculi and their orifices.

fices. The course is long, often extending years, if nothing is done for it; the secretion that at first was purulent becomes mucous and viscid, the mucous membrane may atrophy and the distended sac contain nothing but tears. The epiphora still remains. A person suffering from this chronic form may have an attack of acute inflammation suddenly develop. The skin over the sac becomes reddened and greatly swollen, the swelling often extending to the lids and to the conjunctiva, which may become chemotic. There is generally a great deal of pain, so much so that the patient is deprived of sleep. After a few days the skin at the apex shows a yellowish point and becomes perforated. The pus discharges and the swelling gradually disappears. Afterward pus followed by mucus, and later tears, are discharged. As long as this fistula remains open the patient is safe from another attack, but if it closes up a recurrence may ensue."¹⁸

In the spring and autumn of the year the attention of the practitioner is attracted by the number of chil-

¹⁶ London Ophthalmic Review, 1895, Vol. xiv.

¹⁷ Transactions of the Medical Society of the State of New York, 1882, p. 156.

¹⁸ Boston Medical and Surgical Journal, July 29, 1897.

dren who present themselves with corneal ulcers or phlyctenular troubles usually attended by nasal disorders. In such cases there is great congestion of the turbinates, profuse watery discharge, and formation of crusts in the nostrils, the sores extending down on the upper lip. The eye symptoms are persistent and attended by lachrymation and increasing photophobia, which resist local treatment until the nasal affection is cured.

Among the most common ocular troubles caused by diseased conditions of the nose, as of the lachrymal apparatus, although we have many cases of lachrymal trouble which are in no way influenced by conditions in the nose, yet are caused by the passage of germs from the eye through the canaliculi to the lachrymal sac or the nasal duct. We may have stenosis of the canaliculi situated at any place between the puncta and the opening into the lachrymal sac. We then have epiphora as an early symptom, followed sometimes by a contraction or atrophy of the lachrymal sac, but more frequently dilatation and blennorrhea. When the stenosis is situated in the nasal duct below the sac we have abnormal dilatation of the sac, and accumulation of secretion which soon becomes mucopurulent. In these cases, also, the prominent symptom is epiphora, and we may have, following this, conjunctivitis and dacrocystitis. Atrophic rhinitis with fetid discharge is most frequently the cause of lachrymal disturbances. The germs pass through the canal to the sac and remain there, the nidus of infection, until the disease is established. Empyema of the antrum of Highmore may be the cause of lachrymal disease, as the contents of the antrum may enter the nasal duct directly, or purulent secretion from the antrum may pass from the nose through the nasal duct to the sac.

I have now exhausted the literature on ocular disturbances from nasal disease, and I will venture to assert that more than one-third of external ocular diseases have their predisposing cause in the nasal cavities. Hence, I recommend a treatment plain and simple—remove the cause and you have cured the disease. If the disease is traceable directly to pathologic conditions existing in the nose, then it should receive proper treatment, in conjunction with the treatment of the ocular disturbance. If the epiphora is due to stenosis in the canaliculi, occlusion of the puncta, blepharitis, eversion of the puncta, etc., these conditions must be remedied. When the lachrymal sac is filled with acrid or mucopurulent discharge, it should be evacuated by means of firm pressure of the thumb or finger on the sac, pressing the retained secretion out through the puncta, after which the canal should be probed and washed out. In order to introduce the probe or the syringe nozzle the puncta must be enlarged. This may be done by introducing the canaliculus knife into the canaliculi to the nasal bone, the cutting edge being turned toward the eye, and by retracting the lid with the thumb, and drawing the knife out, make a small incision in the punctum, perpendicular to the palpebral fissure, large enough to insert the end of a syringe or Bowman's No. 8 sound. This operation maintains the integrity of the canaliculus, and the pressure of the lids on the eye tends to keep the edges of the wound apart and prevents adhesion and subsequent closure.

For washing the sac I have derived great benefit from the following solution:

R. Fl. ext. hydrastis.	3 iss	44 36
Zinci sulphat.	gr. iv	26
Aquæ destil.	q.s. ad 3ii	59 14

To be injected with the lachrymal syringe every alternate day, the solution as hot as the patient is able to bear. If this or other conservative treatment fail, the obstruction can be relieved by surgical methods, which can be found in any of the ophthalmologic works of the present day.

In conclusion I will quote a few cases where I have successfully cured or relieved the eye symptoms by treating the nasal cavities and giving the eye little or no attention.

Case 1.—Mrs. G., aged 34, consulted me Oct. 15, 1894, on account of a spot on her eye, visible to herself (metamorphopsia). The eye was normal for refraction, the lids were red and slightly swollen. No muscular disturbance. The nose revealed extensive hypertrophy of both inferior turbinates with profuse mucoid discharge.

After the hypertrophies were reduced the lids cleared up and the spots that had been visible to her disappeared.

Case 2.—Mr. H., bookkeeper, age 30, consulted me September, 1895, for severe blennorrhea. Blurred vision and unable to continue work. Wore glasses for correction for $\frac{1}{4}$ D. Hypertrophic astigmatism, axis 90 in each eye. Examination of the nasal passages showed polypoid degeneration of the left inferior turbinate with two very large polypi, with pedicles attached in the middle meatus. On the right side were found two polypi and a large cartilaginous spur from the septum encroaching on the anterior third of the inferior turbinate. The cul-de-sac of the turbinate was filled with decomposed secretion. I removed all the obstructing difficulties of the nasal chambers, and three months after treatment the patient was discharged cured, and up to the present time has had no further return of the eye difficulties.

Case 3.—Mrs. S., age 26, consulted me November, 1895. An ulcer of the cornea of the left eye had been treated locally the preceding two months, with little or no result. Examination of the nose showed a long fissure on the right side of the septum and extensive posterior synechia. After surgical and medical interference in the nose, the ulcer quickly yielded to treatment. Patient was discharged well.

Case 4.—Miss K., school girl, age 15, consulted me February, 1896, on account of epiphora and blurring of vision. On examination I found the vision O D and O S $20/20$ each, without astigmatism. In the nose I found large polypi in the middle meatus with long ridge on both sides of the septum. On the right side of the septum a fissured ridge badly irritated. The cul-de-sac of each inferior turbinate was filled with thick yellow secretion that could not be blown from the nose by the patient. I removed the polypi, thoroughly cauterized the turbinates and locally treated the irritated ridges. The patient soon recovered and has been able to renew her studies without further trouble with the eyes.

Case 5.—Miss F., age 14, March 10, 1896, complained of constant severe frontal headache, shooting pains in the eyes. Examination of the eyes showed them to be nearly emmetropic, vision in both eyes being $20/15$, or a little better than normal, with perfect co-ordination of muscles. Upon examination of the nasal passages I found abundant post-nasal vegetation. Ten days after the removal of the adenoids patient was free from headaches and pain in the eyes, and has had no recurrence of the symptoms.

Case 6.—Mr. S., aged 33, occupation locomotive engineer. Was discharged from the service on account of color blindness. He was unable to distinguish red and green. There was no manifest lesion of the eye, fundus and refraction normal. Examination of the nose showed marked hypertrophy of the middle turbinates, and adhesion of the left middle turbinate and septum. I removed the left middle turbinate and cauterized the right, reducing it sufficiently. The color blindness began gradually to disappear, and in a period of four months the patient was able to successfully pass re-examination, and obtain his old position, which he now holds.

NOTE.—Cuts taken from the author's article entitled, "The Relation of Diseases of the Eye to Diseases of the Nose," in S. A. Bishop, on "Diseases of Nose, Throat and Ear."

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DISCUSSION.

Dr. HENRY GRADLE.—The statement that "about half of the external diseases of the eye have some connection with prior anomalies of the nose" is decidedly at variance with the

statistics I have gathered from my own experience. It is a very small proportion in which the nose plays any role at all. Two cases were quoted which seem to be open to serious doubt unless supported by much more detail than the brief synopsis given. One was ulcer of the cornea. I do not think it has ever been noticed by anyone before that ulcers of the cornea are in any way kept up by intranasal conditions. Indirectly an intranasal disease may lead to ulceration of the cornea, the infection may be conveyed through the fingers to the eyelids and conjunctival sac, or in some cases the infection spreads from the nose to the sac, leading to dacryocystitis. In either case the infection of the cornea having been started, the remote cause no longer has any influence over it. I have not seen anything suggested by actual experience which would show that nasal treatment would influence the course of corneal ulceration. Another instance was quoted, namely, color blindness having been relieved by intranasal treatment. Color blindness, as far as we can judge, is purely a psychic phenomenon. No one has demonstrated that there is a any anomaly of the eye. It is not an acquired thing. Outside of disease of the optic nerve it is a psychic occurrence, and how that could be induced by intranasal anomalies has not been shown by the experience of anyone else. Undoubtedly there are quite a large number of important troubles of the eye which owe their origin to the nose. To those which he has mentioned I might add two varieties. One is the production of iritis in consequence of intranasal suppuration. My attention was called to it by Ziehme, who claimed to have seen it produced by antral suppuration. I have the records of four patients with recurrent attacks of iritis, most of the attacks being distinctly preceded by purulent rhinitis, limited to one side, and the corresponding side of the nose was structurally anomalous. There was either narrowness or deviation of the septum or some of the other conditions known to influence unfavorably the course of nasal suppuration. A second observation is that in some instances peripheral paralyses of the ocular muscles are due to intranasal conditions. I have in a previous paper referred to three successive cases that had come under my observation. I have seen two others since, where the paralysis occurred in one of the branches of the third nerve or was limited to the abducens, where the entire course and recovery characterized the trouble as peripheral. In all these patients the paralysis was preceded by acute suppuration in the side of the nose corresponding to the affected eye.

Dr. WILLIAM L. BALLENGER.—The essayist mentioned enlargements of the sphenoid and ethmoid bones, and I am not sure whether he meant simply hypertrophy of the bony tissue or a dilatation of the cells. But what I want to refer to is suppurative diseases of the accessory cavities. Let us take, for instance, empyema of the sphenoidal sinuses. If you will recall the anatomy of the parts, the position in which the optic nerve passes through the foramen and on to the globe of the eye, you will see that it passes over the sphenoidal sinus, and if there is an empyema of any considerable extent of the sinus the bony tissue becomes inflamed, softens, yields and is pressed upward, and as it presses upward the optic nerve is choked or compressed at its entrance into the foramen and we may have either a sudden, partial or complete blindness as a result. If we have empyema of the ethmoidal cells, pressure inward will produce disturbance of the muscles of the eye, and strabismus of one type or another may result. There is another condition related to suppurative disease of the ethmoidal cells which resembles dacrocystitis very much. A little lump appears upon the skin, but not in the same situation as in dacrocystitis, but above the inner canthus of the eye. This is due to a pouching of the fluids or pus formation in the ethmoidal cells.

I have never seen a case of polypus of the inferior turbinated body reported. Zuckerkandl, in his great work, says he has never found polypus of the inferior turbinated body. I think it is generally accepted as a clinical fact that polypi do not occur here. I think that most of the inflammatory diseases of the conjunctiva and lachrymal apparatus, which the Doctor mentioned, would not necessarily be extensions from the nasal tract, but that the condition which caused the nasal disease also caused the eye disturbance. We do not understand very fully the nature of these inflammatory conditions, especially of the acute type. It is reasonable, however, to believe that the conditions have a common origin in something that has not been mentioned.

Dr. HAIGHT.—In answer to Dr. Gradle's remarks about the condition of the nose having nothing to do with a persistent ulcer of the cornea, I will say that I had, in my clinic at the Chicago Eye, Ear, Nose and Throat College, a boy 12 years old, who had a phlyctenular ulcer of the cornea lasting one year.

This boy had been treated in one of the post-graduate schools, in this city, nine months previous to the time he came to me, three months ago. He had much photophobia, profuse lachrymation, the upper lid was swollen so that the eye could not be opened by patient. There was watery discharge from the nose with post-nasal adenoids and enlarged tonsils. The adenoids and tonsils were removed and the nose treated in conjunction with the eye, and now the eye is entirely well with the exception of this resulting corneal opacity, which is clearing up. In connection with the case of color blindness I refer to the cases reported by Hamilton. While the case I reported of complete color blindness is the only one that came under my notice, still I have had other cases of contraction of the visual fields. What causes it I do not know. Dr. Ballenger misunderstood me. In my paper I spoke of polypoid degeneration of the inferior turbinated body, a condition which we frequently find.

TRAUMATIC CORNEAL ULCER; REPORT OF A CASE.

BY J. W. SHERER, M.D.

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Nov. 9, 1897, N. O., male, age 55, Swede laborer, applied at the clinic of Professor W. C. Tyree of the Kansas City Medical College, for dispensary treatment for an injury of the left eye.

Previous history.—No ocular disease had been experienced. Hard chancre was reported to have been contracted twenty years ago but none of the usual syphilitic sequelæ followed. General health has always been robust and an open air life led. Of late years there has been some inconvenience from advancing presbyopia, but the aid of glasses has not been sought.

Present condition.—November 6, while crushing stone with a hammer a fragment, presumably of stone, struck the left eyeball and caused intense pain. Rubbing and wiping the eye, an effort was made to continue the work. Next day the eye was still painful, became red and some discharge was observed. The symptoms increased in severity, causing sleeplessness, loss of appetite, perpetual shooting pains through the head, violent pain in the eyeball and painful photophobia.

Examination.—November 9, the fourth day of the disease: O. D. V. = 5/x. O. S. V. = 2/L. The vision secured with the right eye was practically normal for the light and card used; the exterior of this eye was also normal. Ocular tension normal. In the left eye there was severe bulbar conjunctivitis, most intense in the ciliary zone, and some injection of the blepharal conjunctiva. The lids were somewhat swollen, edematous and heavy. In the culs-de-sac some mucus was found, but no microscopic examination was made. A shallow, central corneal ulcer was found which was foul and progressive. Its diameter was about three millimeters, its edges undermined and a narrow boundary of cloudiness marked the limit of cellular infiltration. The remainder of the cornea was clear. The iris was slightly injected, its motility sluggish. Pupil three millimeters. Ocular tension normal. Ophthalmoscopic examination of the right eye showed clear media, normal fundus and hypermetropia = + .50. In the left eye the fundus could not be readily seen but the reflex was normal and, obliquely, the media appeared clear and fundus normal.

With a + 16, the ulcer was seen to be an excavation with overhanging edges. It contained much debris, slough and pus. A diagnosis was made of infected corneal ulcer from traumatic contusion and laceration and treatment ordered as follows: Hot compresses four times daily twenty minutes at a time, the com-