into or passing through the lens are, as you are all aware, by no means infrequent. In a few of these the opaque spot has remained partial—sometimes even it becomes smaller—years afterward than just after the wound. Especially is this so where a very fine body jams through into the vitreous with great force, while wounds from pins, or bodies, be they never so small, which have been passed only just through the anterior capsule and been withdrawn are almost invariably followed by complete opacity sooner or later. The following unique case is, however, an exception: Chas. Lutz, aged 22, residence Terre Haute, Ind., was sent to me by his physician on account of an injury to the right eye by a piece of percussion cap three days before. On examination I found that it had passed through the lower part of the cornea and iris into or through the lens, the last named body being quite opaque throughout—at least its lower two-thirds.

As he could not remain under my care I wrote to his physician, suggesting ice, atropine, and leeches if the inflammation ran high, and requested that he be sent down if much pain and tenderness in ciliary region became manifest. I heard that he was doing well two months subsequently, and did not again hear from him until I met with Dr. J. P. Farrell, of Terre Haute, about three weeks ago who informed me of the following very remarkable behavior of the case. When the doctor returned to Terre Haute from Europe the patient immediately called upon him, when a projection of the iris was visible, looking as if a body was lodged behind it. Again, in a few weeks, some kind of a foreign body was seen in the lower part of the aqueous chamber. Again in a few weeks, it was seen in the tissue of the cornea, and, lastly, the young man accosted the doctor on the street to inform him that he had the foreign body at home, he having picked it from the eye. At my request Dr. Farrell kindly wrote me the following letter on June the 1st inst.:

"* * * I found the eye quiet, presenting a ring-shaped, or, rather, semicircular white opacity at the lower and inner quadrant of the cornea. In the space included between this semi-circle and the corneal border there is a dark point evidently due to adhesion of iris to inner corneal surface. Pupil eccentric and pear-shaped, due to ant. synechia. Lens clear, with the exception of the slight degree of opacity along a cicatricial line which is seen in the ant. capsule V = $\frac{1}{2}$. The eye is entirely quiet and has given him no trouble, though actively engaged at his work, that of a nail-feeder, which requires close attention.

"The foreign body, I may add, is about 2 mm. square, being of the thickness of good writing paper. Further, I wish to say, that running from the situation of the cicatrix on the capsule, to the point of union of the synechia to the cornea, is a white band to which the lacerated iris is attached. This band I once thought was the lens capsule, but yesterday I came to the conclusion that it is not.

"Signed, J. P. FARRELL."

The above questions have been of deep interest to me, and doubtless similar ones have often agitated

the minds of many others, and, as no better opportunity will ever offer for an interchange of views and the relating of personal experiences upon the above questions, I therefore give it as my reason for bringing the subject before you on this occasion.

DISCUSSION.

Dr. Noyes, of New York, said he had seen similar cases quite frequently, and had them divided into two classes—those accompanying myopia and being of a molecular form, and those in which the opacity is striated and caused by choroidal retinitis. He thought the opacity was due to impaired nutrition of the hexagonal epithelium, and that it required years for its development.

Dr. Frothingham said that the paper was the result of carefully kept records, and if every one would take the trouble to keep such records, many points about which we are still in the dark might thereby be cleared up.

Dr. Thompson, in closing the discussion, said that he had nothing further to add except that he had found his records of cases of great advantage to him.

THE ACTION OF NITRATE OF SILVER UPON THE MUCOUS MEMBRANE OF THE THROAT AND NOSE.

BY CARL SEILER, M.D., OF PHILADELPHIA.

[Read to the Section on Ophthalmology, Otology, and Laryngology.]

It is not my intention to present an exhaustive essay to the Section, but simply to make a few remarks concerning the action of the silver salt upon the mucous membrane, and to record some observations made by myself, with the hope of giving rise to a discussion on this interesting subject.

We are all familiar with the popular notion that nitrate of silver is a caustic, and is held in abhorrence by the patients, and used sparingly and in weak solutions by the physician in dealing with inflammations of the mucous membrane of the throat and nose. It may, therefore, be startling to you when I make the statement, the conclusion arrived at from clinical experience and microscopical examination of the tissue, that nitrate of silver, solid or in solution, is not a caustic—*i. e.*, it does not destroy the epithelial covering, and its action is different with the strength of solution used. The action of the solid stick or super-saturated solution upon the undenuded mucous membrane is first a combination of part of the silver with the albumen, mucine, and chlorides contained in the secretion of the immediate neighborhood of the spot touched, and the formation of a thick, tenacious, yellowish white pellicle adhering tightly to the epithelial covering. The surplus of silver which is not thus converted penetrates the interstices of the epithelium and becoming reduced to the oxide of silver or deposited as very fine granules of oxide of silver which act as foreign bodies and give rise to congestion and inflammation in their immediate neighborhood, which continues with more or less severity until the tissues

have become accustomed to the presence of the foreign body. The pellicle formed, although at first tightly adhered to the surface, soon becomes loosened as the increased blood supply hastens cell death, and is pushed off by the exfoliation of the upper layer of epithelial cells, leaving underneath it a healthy surface covered by epithelial cells. A section carried through the mucous membrane which has been acted upon by the stick or a super-saturated solution does not show any cell disintegration by the drug.

Clinically we observe that the solid stick or a super-saturated solution does not produce much pain on the healthy mucous membrane, but acts as a localized stimulant and, through the formation of the pellicle, as a protective. When applied, on the other hand, to a surface denuded of its epithelial covering the solid nitrate of silver, by combining with the albumen and protein of the granular cells, forms a similar pellicle as is seen on the healthy surface, but melts the upper layer of the cells. It thus again acts as a protective and local stimulant exciting healthy granulation and the reformation of the epithelial covering.

Experiments carried on with solutions of different strengths, such as 250, 200, 180, 120, 60, 40, 20, and 10 grs. to the ounce of water, gave much the same results, when sections were made and examined under the microscope as were noted when the solid stick or a super-saturated solution was used, except that with the decreasing strength of solution, a decrease in the thickness and firmness of the pellicle, and a diminution in the number of granules of oxide of silver were noticed. The experiments were made on rabbits and dogs at the pathological laboratory of the University of Pennsylvania, and the silver salt was allowed to act upon the mucous membrane from 10 to 20 minutes, except in the case of the experiments with the solid nitrate of silver, when, in some instances, 62 and 24 hours were allowed to elapse before the animal was killed and the tissue prepared for section. The sections were made for me by my friend Mr. —, of the University.

The clinical observations with the different strengths of solution extend over a number of years, and were made on myself as well as a large number of patients, and may be summed up in a few words.

Solutions of from 250–120 grs. strength act similarly to the solid stick—that is, little or no pain is felt on contact; a thick pellicle formed, and the localized inflammation is of short duration. Solutions from 120–60 grs. produce no pain whatever; on the contrary, act as local anæsthetics. When applied to an inflamed surface they produce no perceptible localized inflammation, but stimulate glandular secretion. The pellicle formed is but slightly adhered, and can be pulled off after a few hours. They also act as powerful astringents, and frequently will cut short an acute inflammation of the mucous membrane when they are applied before inflammatory infiltration into the tissue has occurred—that is, within twenty-four hours from the onset of the inflammation.

Solutions of less than 60 grs. produce the more pain the weaker they are, which is also more and

more lasting, so that the anæsthetic and astringent action diminish on an equal ratio with the strength of the solution, while the stimulant and irritant action increases as the solution becomes weaker. The protective quality of the pellicle, which, however, is formed even with a 10-gr. solution, and which probably has given rise to the belief that the silver salt is a caustic by having been mistaken for an eschar, diminishes also with the strength of the solution. The glandular secretions are materially increased by these weak solutions. Thus it will be seen that nitrate of silver, like many other drugs, should not be used indiscriminately, but that the strength of the solution should be properly gauged by the action desired. For if we want an astringent, sedative and protective action, we should not use a solution of less than 60 grs., while, on the other hand, if we want a lasting stimulant and irritating action, the weaker solutions are indicated. Also if we want to increase the glandular secretion or want to induce absorption of old inflammatory deposits, the irritant action of the weak solutions is of great value. When a long-continued irritating and stimulating action is desired, such as is necessary in atrophic nasal catarrh, for instance, I have found that solid nitrate of silver, the fine powder highly diluted with starch powder, is preferable to a solution, since the fine granules of the silver salt in contact with the atrophic mucous membrane set up points of inflammation and increased blood supply all over the mucous membrane, thus stimulating the few remaining glands to increased action which in time becomes permanent.

Want of time and opportunity have prevented me from making observations on the action of the silver salt on the mucous membrane of the eye, but I have no doubt that the action is similar, if not the same, except that on account of the large amount of chlorides in the secretion of the lacrymal gland a larger proportion of the nitrate is at once converted into the inert and insoluble chloride of silver.

DISCUSSION.

Dr. Jarvis fully agreed with Dr. Seiler's views; and Dr. Roe said he also had found, like the author of the paper, that a solution of from 60 to 120 grains to the ʒj of water will almost invariably cut short an acute tonsillitis.

Dr. L. Turnbull said he had seen solid nitrate of silver produce sores upon the skin, and that he was in the habit of destroying polyps with the solid stick.

Dr. Conner, of Detroit, said that in the main he agreed with Dr. Seiler, but had seen a case in which serious sloughing of the tissues around the eye had followed the application of solid nitrate of silver. He thought a great deal depended upon the length of time that the drug was allowed to act upon the tissues. All other speakers agreed with Dr. Seiler, that nitrate of silver was a most valuable drug if properly used, but disagreed in regard to the non-caustic action of the solid stick.

Dr. Seiler, in closing the discussion, said that he could explain the production of sores and sloughs by nitrate of silver, which he had frequently seen. They were caused, not by the destruction of the epithelium,

but by the localized inflammation due to the irritant action of the granules of oxide of silver which are deposited in the dermal and subdermal tissue, thus hastening cell death and producing ulceration, as any other localized inflammation may do.

FOUR CASES OF EYE DISEASE FOLLOWING BRAIN DISEASE.

BY HENRY G. CORNWELL, M.D., COLUMBUS, O., PROFESSOR OF OPHTHALMOLOGY AND OTOTOLOGY IN STARLING MEDICAL COLLEGE.

[Read in the Section on Ophthalmology, Otology and Laryngology, June, 1883.]

HEMIANOPSIA HOMONYMA DEXTRALIS AFTER APOPLEXY.

Mrs. S., aged 65, an intelligent lady of Columbus, was sent to me by Dr. Fullerton, her family physician, February 1, 1883, for advice concerning a defect of vision, which had made its appearance three months before. The previous history of her case is as follows:

Two years before she had an attack of apoplexy, was comatose for twelve hours, and remained hæmiplegic on the left side for nine months, improving gradually until she entirely recovered without sequellæ from her illness, and enjoyed good health for fourteen months. One month before I saw her she was about to call on some of her friends, and as she ascended the steps her vision became suddenly obscured, and on entering the house she observed that she could only see the left half of objects toward which her eyes were directed. Her mental faculties remained clear, and she was absolutely free from all other symptoms of intra-cranial disease. Her hemianopsia (it being right-sided) prevented her from reading, a thing which distressed her exceedingly. On examination I found central vision $\frac{xx}{20}$, or normal. Entire absence of all visual impressions, except for light over the right half of the visual field, the line of demarcation being sharply defined and extending to the macula lutea. Visual and color sense normal over the left half. Ophthalmoscopic evidence negative. Her condition remains, after three months, unchanged.

My view of the pathological condition in this case is, that at the time of the sudden appearance of the hemianopsia the patient had a second hæmorrhage of slight extent, doubtless into the occipital lobe of the left hemisphere, the injury to the brain substance being only sufficient to produce the visual defect.

A CASE OF MONOCULAR OPTIC NEURITIS, FROM BRAIN DISEASE.

J. H., æt. 26, of Mt. Vernon, O., a machinist, single, visited me October 20, 1882, on account of a failure of vision in the right eye of three weeks duration. From his history he had evidently contracted syphilis five years before. On examination, the vision of the right eye was reduced so that he could see only to count fingers at five feet. He had also paralysis of the third nerve on the same side, producing ptosis, a dilated and fixed pupil, and divergent strabismus. The sense of smell was wholly gone on that side. The patient also complained of severe

frontal headache, and became at times very giddy and faint. The ophthalmoscope revealed a violent monocular right-sided optic neuritis, the swelling amounting to three dioptics. Left eye vision and ophthalmoscopic appearances normal. The bichloride of mercury and iodide of potassium were given in large doses for some weeks, and improvement followed so far that some movement of the globe inward could be obtained. Atrophy of the optic nerve succeeded the neuritis, and vision was reduced to perception of light. No further improvement followed treatment.

The eye-condition in this case evidently was due to an intra-cranial gummosus formation at the sphenoidal fissure and optic foramen on the right side.

PARALYSIS OF SIX OF THE CRANIAL NERVES FROM BASILAR MENINGITIS.

J. D., æt. 37, a dentist of Columbus, visited me May 18, 1883. During the war, he received a flesh wound in the right forearm, and was left uncared for in a vacant house for 48 hours; the nights were very cold. Following this he had swamp-fever, and subsequently became seriously ill with some form of brain disease. His recovery was complete, except so far as his eyes were concerned, they having remained unchanged since his convalescence, except that his visual power is monthly decreasing.

Status præsens.—Patient in an advanced stage of pulmonary consumption; no history of syphilis. Absolute immobility of both eyeballs, and double ptosis, from paralysis of the third, fourth and sixth pairs of cranial nerves. Paralysis of the facial on both sides; some impairment of cutaneous sensibility over the face. Vision, ability to count fingers at five feet. The optic nerves in an advanced stage of secondary atrophy; the irides and ciliary muscles not paralyzed. He has never had any form of general paralysis, and his intelligence has not been impaired since his illness.

This case exhibits paralysis of six pairs of the cranial nerves. I regard the condition as having been due to a basilar meningitis which succeeded the intermittent fever.

A CASE OF CHOKED DISC ASSOCIATED WITH A TUBERCULAR TUMOR IN THE CEREBELLUM.

On the first of April, 1882, I was invited by Dr. Buckner, of Youngstown, O., to make an ophthalmoscopic examination in a case of brain disease, the previous history of which is as follows:

The patient, H. W., æt. 26, a locomotive engineer, had suffered for some weeks with intense frontal headache and lancinating pains shooting through the head from the occiput to the vertex. He had frequent attacks of giddiness and faintness, and on several occasions had convulsions after running. He had also become totally deaf on the left side. His vision was $\frac{xx}{20}$, both eyes. No marked change in the visual field. Ophthalmoscope revealed choked disc; the swelling of the heads of the nerves measured five dioptics. Rapping on the head did not give rise to pain. The tuning-fork was not heard on the left side. Brain tumor was diagnosed, and unfavorable prognosis given. No evidence of syphilis